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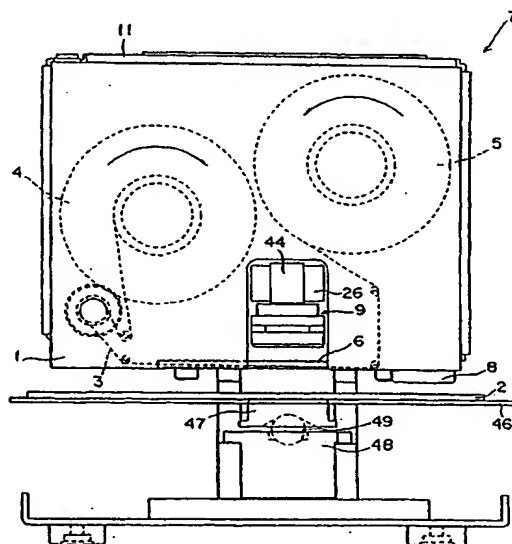
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(54) **Hot-stamping foil tape cassette and foil-peeling mechanism for hot-stamping device and peeling method for hot-stamping foil and control method for hot-stamping foil tape cassette**

(57) A hot-stamping foil tape cassette (1) comprises a hot-stamping foil tape (3) transferred by pressure application together with a value-added medium (2) to the value-added medium (2) and a windup reel (4) for winding up the hot-stamping foil tape (3). The reel (5) on which the hot-stamping foil tape (3) is wound is stored in a cassette case. A shutter (6) is included which at the time of hot-stamping transfer is in a protective position that protects the hot-stamping foil tape (3). The shutter (6) at the time of hot-stamping transfer withdraws to a withdrawal position that does not interfere with action of the hot-stamping transfer. After hot-stamping, by the shutter (6), the hot-stamping foil tape (3) can be peeled from the value-added medium (2). A foil-peeling mechanism for a hot-stamping device (7), a peeling method for a hot-stamping foil (3) and a control method for a hot-stamping foil tape cassette (1) are also disclosed.

Fig.1



the number of sheets proffered, and extras are provided. For this reason, it is not possible to recover an appropriate royalty corresponding to the number of sheets issued of the value-added medium, in other words, sheet usage count of holographic foil. Further, in the case of holographic foil of continuous design where there are no identification marks to determine location, because of a variation in the roll-up spacing of holographic foil, the number of stampable sheets from a roll of tape varies to the end; this is unfair and inequitable.

[0016] Second, as a countermeasure to wrongdoing such as theft and forgery of the holographic foil itself, it is dependent in many cases on the controller of the holographic foil or the user of hot-stamping device. This requires expenditure of manpower and, further, it is difficult to constantly maintain control quality under actual conditions.

[0017] Third, when special holographic foil is used, created according to individual request from the customer, there is a need every time the holographic foil is exchanged, to change the setup of the hot-stamping device to optimal stamping conditions (for example, optimal temperature, optimal pressure application, optimal time, etc.), according to the kind of holographic foil or according to directions from the manufacturer of holographic foil; this is complicated.

#### OBJECTS AND SUMMARY OF THE INVENTION

[0018] Therefore, this invention has as a primary object providing hot-stamping foil tape cassette that enables satisfactory peeling of hot-stamping foil with no damage to the value-added medium and, moreover, provides easy exchange operations for holographic foil and the foil-peeling mechanism in a hot-stamping device and a peeling method for a hot-stamping foil.

[0019] Further, this invention has as a further object, providing a hot-stamping foil tape cassette and a control method for hot-stamping foil tape cassette wherein control of the hot-stamping foil can be performed simply and, moreover, appropriately, such as control of sheet count of hot-stamping foil, prevention of wrongdoing such as forgery to hot-stamping foil, and determination of optimal stamping conditions according to hot-stamping foil.

[0020] In order to achieve such objects in accordance with the invention, in a hot-stamping foil tape cassette, a hot-stamping foil tape is transferred by pressure application together with a value-added medium to the value-added medium, and a windup reel for winding up a hot-stamping foil tape, and a reel on which hot-stamping foil tape is wound, is stored therein. The cassette case has a shutter that, except at the time of hot-stamping transfer, is in a protective position that protects hot-stamping foil tape. On the other hand, at the time of hot-stamping transfer the shutter withdraws to a withdrawal position that does not interfere with action of said hot-stamping transfer. After hot-stamping, by means of the

shutter, hot-stamping foil tape can be peeled from the value-added medium.

[0021] Therefore, except at the time of hot-stamping transfer, the hot-stamping foil is protected by a shutter from physical damage such as dirt, heat, cuts and scratches, etc. On the other hand, when the shutter is opened at the time of hot-stamping and the shutter is closed again after hot-stamping, the shutter is inserted between the hot-stamping foil tape and the value-added medium to enable peeling of hot-stamping foil tape from the value-added medium.

[0022] Further, in accordance with the invention, a foil-peeling mechanism of a hot-stamping device is provided with a hot-stamping foil tape cassette as described above, and a cassette movement mechanism that makes a hot-stamping foil tape cassette come in contact with a value-added medium at the time of hot-stamping and together with this, after hot-stamping, withdraws the hot-stamping foil tape cassette from the value-added medium, at the time of hot-stamping, the shutter in the hot-stamping foil tape cassette opens; on the other hand, after hot-stamping, the shutter is closed in conjunction with withdrawal of a hot-stamping foil tape cassette from the value-added medium to peel the hot-stamping foil tape from the value-added medium.

[0023] Consequently, as the hot-stamping foil tape cassette is being withdrawn from the value-added medium to pull up the hot-stamping foil tape from the value-added medium, the shutter is being inserted between the hot-stamping foil tape and the value-added medium. In this mode, the hot-stamping foil tape can be peeled from the value-added medium consistently and, moreover, in satisfactory fashion.

[0024] Further, in accordance with the invention, in a foil-peeling mechanism in a hot-stamping device, the cassette movement mechanism has a connection part connecting to the shutter, the shutter is opened and closed by action of cassette movement mechanism. Consequently, cassette action of withdrawing from the value-added medium and closing the shutter can be linked so that as the hot-stamping foil tape is being pulled up from the value-added medium, the shutter is being inserted between the hot-stamping foil tape and the value-added medium.

[0025] Further, in a peeling method for the hot-stamping foil described in accordance with the invention, the hot-stamping foil tape cassette described above is used; at the time of hot-stamping, the hot-stamping foil tape cassette is made to come in contact with the value-added medium and, moreover, the shutter in the hot-stamping foil tape cassette is opened, after hot-stamping, as the hot-stamping foil tape cassette is being withdrawn from the value-added medium, the shutter is closed to peel hot-stamping foil tape from the value-added medium.

[0026] Therefore, except at the time of hot-stamping transfer, the hot-stamping foil is protected by the shutter from physical damage such as dirt, heat, cuts and

Fig. 1 shows one embodiment of hot-stamping device, utilizing peeling mechanism of a hot-stamping foil tape cassette and a hot-stamping device of this invention, and a simplified front view showing hot-stamping device in a readiness state;

Fig. 2 is a simplified front view of said hot-stamping device, showing the state when hot-stamping foil tape cassette comes in contact with a value-added medium;

Fig. 3 is a simplified front view of said hot-stamping device, showing the state when stamping section comes in contact with value-added medium through the hot-stamping foil tape;

Fig. 4 shows one example of construction for driving cassette movement mechanism and stamping section in said hot-stamping device, and a simplified cross-sectional view from the side of hot-stamping device, seen from the inside face of frame on right side of hot-stamping device shown in Fig. 1;

Fig. 5 is a simplified cross-sectional view from the side of hot-stamping device, showing the state when insertion block from state in Fig. 4 comes in contact with stamping section in said hot-stamping device;

Fig. 6 is a simplified cross-sectional view from the side of hot-stamping device, showing the state when hot-stamping foil tape cassette from state in Fig. 5 comes in contact with the value-added medium in said hot-stamping device;

Fig. 7 is a simplified cross-sectional view from the side of hot-stamping device, showing the state when the stamping section from state in Fig. 6 comes in contact with the value-added medium through the hot-stamping foil tape in said hot-stamping device;

Fig. 8 is a figure explaining one example of construction of cassette movement mechanism, and a simplified front view of hot-stamping device, showing a mode of attachment of innermost plate;

Fig. 9 is a figure explaining one example of the construction of cassette movement mechanism, and a simplified front view of hot-stamping device, showing a mode of attachment of middle plate;

Fig. 10 is a figure explaining one example of construction of cassette movement mechanism, and a simplified front view of hot-stamping device, showing mode of movement as a unit of middle plate and innermost plate;

Fig. 11 is a figure explaining one example of construction of cassette movement mechanism, and a simplified front view of a hot-stamping device, showing a mode when innermost plate moves differently from middle plate;

Fig. 12 is a simplified front view of hot-stamping device, showing one example of construction of connection part connecting to a shutter provided on cassette movement mechanism;

Fig. 13 is a figure explaining an action of foil-peeling

mechanism in this invention, and is simplified front view showing hot-stamping device in a readiness state;

Fig. 14 is a simplified front view explaining action of foil-peeling mechanism in this invention, showing the state when hot-stamping foil tape cassette from the state in Fig. 13 comes in contact with the value-added medium;

Fig. 15 is a simplified front view explaining action of foil-peeling mechanism in this invention, showing the state when stamping section from the state in Fig. 14 comes in contact with the value-added medium through hot-stamping foil tape;

Fig. 16 is a simplified front view showing one example of hot-stamping foil tape cassette utilizing this invention;

Fig. 17 is another embodiment of foil-peeling mechanism of this invention, showing an example provided with actuator for opening and closing shutter, and a simplified front view showing hot-stamping device in a readiness state;

Fig. 18 is a simplified front view showing said another embodiment of this invention, and shows state when hot-stamping foil tape cassette from state in Fig. 17 comes in contact with the value-added medium;

Fig. 19 is a simplified front view showing said another embodiment and shows state when the stamping section from state in Fig. 18 comes in contact with the value-added medium through hot-stamping foil tape;

Fig. 20 is a simplified cross-sectional view from the side showing one example of attachment of actuator for opening and closing the shutter;

Fig. 21 shows one embodiment utilizing a hot-stamping foil tape cassette and control method for hot-stamping foil tape cassette in this invention, and is an image diagram showing a mode where multiple users use different hot-stamping foil tape;

Fig. 22 is a simplified block diagram showing one embodiment of a communication function between the hot-stamping foil tape cassette and a hot-stamping device in this invention;

Fig. 23 is a flow chart showing one example of a process in a hot-stamping device utilizing control method for a hot-stamping foil tape cassette in this invention;

Fig. 24 is a flow chart showing one example of a cassette identification process, and shows one example of a process in a hot-stamping device utilizing a control method for a hot-stamping foil tape cassette in this invention;

Fig. 25 is a flow chart showing one example of a checking process for an approved stamping cycle number, and shows one example of a process in a hot-stamping device utilizing a control method for a hot-stamping foil tape cassette in this invention;

Fig. 26 is a flow chart showing one example of a

3 is positioned at an angle to document 2 so peeling of carrier film by shutter 6 can be effected in satisfactory fashion.

[0046] For example, hot-stamping device 7 is equipped with a cassette-movement mechanism 14 that makes cassette 1 come in contact with document 2 at the time of hot-stamping with a load such that there is no shifting of this document 2, and in conjunction with this, withdraws cassette 1 from document 2 after hot-stamping. By means of cassette 1 provided with shutter 6 and cassette movement mechanism 14, cassette 1 is made to come in contact with document 2 at the time of hot-stamping; moreover shutter 6 opens, after hot-stamping, the shutter is closed as cassette 1 is withdrawn from document 2 to peel hot-stamping foil tape 3 from document 2 by means of foil-peeling mechanism 15 in the structure. Furthermore, in this embodiment, cassette movement mechanism 14 is provided with connection part 57 that connects with shutter 6, shutter 6 is opened and closed by action of cassette movement mechanism 14.

[0047] One example of construction of hot-stamping device 7 provided with such foil-peeling mechanism 15 is described below.

[0048] Frame 10, 10 in hot-stamping device 7 is provided with guide shaft 16, 16 in the vertical direction. In this embodiment, cassette-movement mechanism 14 is constructed as follows to enable movement of cassette 1 in the shaft direction for guide shaft 16 through plate 11, 12, 13.

[0049] Plate 13 is provided with flexing section 13a attached to guide shaft 16 so flexure is possible, attachment to guide shaft 16 is such that movement is possible (see Fig. 8). Further, plate 13, for example, by means of torsion coil spring 17 that exerts force, comes in contact with stopper 18 provided on frame 10.

[0050] On plate 12 also, flexure section 12a is provided, attached to guide shaft 16 so flexure is possible; plate 12 is attached to guide shaft 16 so movement is possible by passing through cutout section 13b in plate 13 and in alignment with plate 13 (see Fig. 9). Further, plate 12 is connected to plate 13 through means to exert force, torsion coil spring 19, for example. For example, catch 12b provided on plate 12 is inserted into cutout section 13c of plate 13, spring 19 is attached to catch 12b and catch 13d provided on plate 13. By this means, as plate 13 moves along guide shaft 16, plate 12 moves with it as a unit (see Fig. 9, Fig. 10). On the other hand, for example, when cassette 1 is in contact with document 2 to prevent movement of plate 12, plate 13 alone moves in opposition to the force exerted by spring 19, in other words, there is difference in movement between plate 12 and plate 13 (see Fig. 11).

[0051] Further, in this embodiment, photosensor 20 instantly detects the difference in movement between plate 12 and plate 13. For example, photosensor 20 is fixed on plate 13 and moves as a unit with plate 13. Further, shielding 12c is provided on plate 12 side to shield

photosensor 20 at the instant there is difference in movement between plate 12 and plate 13. Shielding 12c is provided, for example, by bending one part of plate 12. By detecting the instant that shielding 12c shields photosensor 20, the instant there is difference in movement between plate 12 and plate 13 is detected.

[0052] Plate 11 is attached to plate 12 so it moves as a unit with plate 12 in the shaft direction of guide shaft 16. Moreover, cassette 1 is supported by plate 11. In other words, cassette 1 is able to move in the shaft direction of guide shaft 16 through plate 11, 12 and 13.

[0053] Slide shaft 21 is fixed on the back side of cassette 1 mounting face in plate 11, connection part 57 (slide plate) is built in so that horizontal movement is possible with slide shaft 21 as guide (see Fig. 12). Slide plate 57 has protrusion 57a, when cassette 1 is mounted on plate 11, protrusion 57a and shutter 6 make connection.

[0054] Further, on the back side of cassette 1 mounting face in plate 11, lever 22 is attached so that rotation is possible with shaft 23 as center (see Fig. 12). On lever 22, pin 24 is attached to make connection with L-shaped groove 13e formed on plate 13. By this means, lever 22 rotates with shaft 23 as center through connection pin 24, by the relative motion downwards in the figure of plate 13 to plate 11 (see Fig. 13 to Fig. 15). Moreover, cutout section 12d is formed in plate 12 so that there is no interference to movement of connection pin 24. Further, there is long hole 22a in lever 22, ridged pin 25 attached to slide plate 57 makes connection with long hole 22a. By this means, rotation of lever 22 and movement of slide plate 57 are linked through ridged pin 25.

[0055] Further, hot-stamping device 7 comprising one embodiment of this invention, has stamping arm 26 with one end being free end, and stamping section 9 positioned at said free end to apply pressure to hot-stamping foil 3 and value-added medium 2 to transfer hot-stamping foil to value-added medium 2, and first cam 27 in contact with stamping arm 26 to move stamping section 9 to close proximity of value-added medium 2, and first drive section 28 driving first cam 27, and second cam 29 bringing pressure-exerting load to bear on stamping section 9 moved to close proximity of document 2, and second drive section 30 driving second cam 29.

[0056] Stamping arm 26 of this embodiment is equipped, for example, with cam follower 31 in contact with cam 27 and cam follower 32 in contact with cam 29. There is space on stamping arm 26 to attach cam follower 31 and cam follower 32. Cam follower 31 and cam follower 32 are, for example, both constructed of rollers; cam follower 31 is attached about midway along the lengthwise direction of stamping arm 26, cam follower 32 is attached near the back end of stamping arm 26; each of these rotates freely. Further, bearing 33 is attached on the side face of stamping arm 26, on the same shaft as cam follower 31. Bearing 33 is fitted so it can flex, in long hole 34 formed in frame 10.

[0057] As shown in Fig. 4 in this embodiment, for ex-

fectured expeditiously. Further, preheating is not essential, there is no need for preheating in situations where prevention of power consumption is a priority.

[0070] Further, in the readiness state, stamping arm 26 is positioned between stamping block 9 and insertion block 44 so that there is 0.5 mm space, for example. By this means, heat of stamping block 9 does not escape to the side of stamping arm energy 26, and energy consumption is suppressed.

[0071] When document 2 is placed on table 46, and hot-stamping command is given, cam 27 rotates clockwise in Fig. 4, by stepper motor 37 drive. Following the ring perimeter shape of cam 27, cam follower 31 moves as it opposes the force exerted by spring 35 and spring 36. By this means, as bearing 33 moves downwards in the figure along long hole 34, stamping arm 26 rotates with the contact point of cam 29 and cam follower 32 as a fulcrum of rotation. Shortly, insertion block 44 comes in contact with the top face of stamping block 9 (see Fig. 5).

[0072] Furthermore, when cam 27 rotates and stamping arm 26 rotates, insertion block 44 inserts stamping block 9 downwards toward document 2. Stamping support plate 58 supporting stamping block 9 is fixed on plate 13, plate 13 is pushed downwards along guide shaft 16 as it opposes the force exerted by spring 17. Plate 12 connected to plate 13 and spring 19, plate 11 attached to plate 12 as a unit in the vertical direction, and cassette 1 supported on plate 11 also move downwards together with plate 13.

[0073] Cassette 1 moves downwards toward document 2, initially clasper 8 comes in contact with document 2, in a short time, the entire bottom face of cassette 1 comes in contact with document 2 by means of a load sufficient to prevent shifting of document 2. By this means, hot-stamping device 7 is in the state shown in Fig. 2, Fig. 6 and Fig. 14. Further, at this point, plate 12, 13 are in state shown in Fig. 10.

[0074] Furthermore, as cam 27 rotates, and stamping arm 26 rotates, insertion block 44 inserts stamping block 9 further downwards. Here, after the entire bottom face of cassette 1 comes in contact with document 2, cassette 1, plate 11 and plate 12 cannot move downwards. However, plate 13 can move further down as it opposes the force exerted by spring 19 (see Fig. 11).

[0075] When plate 11 and plate 12 stop and only plate 13 moves downwards, connection pin 24 moves L-shaped groove 13e, lever 22 rotates clockwise with shaft 23 as center. Accompanying rotation of lever 22, slide plate 57 slides to the left in Fig. 14, and withdraws shutter 6 linked to slide plate 57 from the face opposite stamping block 9 (see Fig. 15). In other words, shutter 6 that shielded hot-stamping foil tape 3 is in an open state.

[0076] On the other hand, the instant there is a difference in movement between plate 13 and plate 12, in other words, the instant that bottom front face of cassette 1 comes in contact with document 2, that contact

is detected by photosensor 20. Here, distance between stamping block 9 and bottom face of cassette 1 before this detection by photosensor 20 is identical to distance in the readiness state and is known already because plate 11, 12, 13 move as a unit. Therefore, cam 27 is rotated only to the required amount by controlling the pulse count of stepper motor 37 so stamping block 9 is moved only the distance between stamping block 9 and bottom face of cassette 1 at the time of detection by photosensor 20. The shutter opens, bottom face of stamping block 9 comes in contact with hot-stamping foil tape 3, further, through hot-stamping foil tape 3, and stamping block 9 comes in contact with the top face of document 2 on which hot-stamping is to be implemented. By this means, the state becomes that shown in Fig. 3, Fig. 7 and Fig. 15. Furthermore, at this time, the state of plate 12, 13 are shown in Fig. 11. Stepper motor 37 stops in this state, cam 27 also stops and keeps its position. Moreover, because change in radius per angle of rotation for cam 27 was designed to be large, movement of stamping arm 26 from the readiness state to this point can be effected very quickly.

[0077] Next, DC motor 39 is driven, cam 29 is rotated clockwise in Fig. 7. At this time, the contact point between cam 27 and cam follower 31 becomes the fulcrum of rotation, cam follower 32 moves according to the ring perimeter shape of cam 29, as it opposes the force exerted by spring 35 and spring 36 (cam 29 attains state shown by 2-point chain line in Fig. 7). By this means, stamping arm 26 rotates, and exerts pressure on document 2 through hot-stamping foil tape 3. In other words, holographic foil is hot-stamped on document 2. Moreover, because change in radius per angle of rotation for cam 29 was designed to be small, a large load can be brought to bear on stamping arm 26.

[0078] At this point, holographic foil is fused on document 2 by hot-stamping, transparent carrier film supporting holographic foil is also in the fused state on document 2 through fused holographic foil. To complete the hot-stamping process, this carrier film must be peeled off. In this embodiment, carrier film is peeled off by utilizing the closing motion of shutter 6 back to the position in readiness state.

[0079] After hot-stamping, cam 27 rotates counterclockwise in Fig. 4 to return stamping arm 26 to a readiness position. Following rotation of cam 27, force exerted by spring 17 is released, plate 13 and stamping block 9 move upward, plate 12, plate 11 and cassette 1 also move upward to separate from document 2. At the same time, force exerted by spring 19 is released, lever 22 rotates counterclockwise in Fig. 15 with shaft 23 as center to close shutter 6. In other words, shutter 6 begins to close from the time bottom face of cassette 1 separates from document 2. At this point, the front edge of shutter 6 has entered the space between carrier film and document 2, as shutter 6 closes, shutter 6 is inserted between carrier film and document 2, and effects peeling between document 2 and carrier film. Further, at the

57 slides to the left in Fig. 18, to withdraw shutter 6 connected to slide plate 57 from face opposite stamping block 9 (see Fig. 19). Then, when current flow to solenoid 52 stops, plunger 53 returns to its initial position by force exerted by spring 54. By this, lever 22 rotates counterclockwise in Fig. 19 with shaft 23 as center, shutter 6 is closed. Moreover, timing for opening/closing of shutter 6 can be adjusted by on/off of current flow to solenoid 52 by means of control section not shown in figure. It is of course possible to implement opening/closing of shutter 6 by timing identical to that in embodiment described above. In other words, in a readiness state shown in Fig. 1 and Fig. 17, there is no current flow to solenoid 52, as shown in Fig. 2 and Fig. 18, current flow to solenoid 52 begins at the time difference in movement between plate 12 and plate 13 occurs when cassette 1 comes in contact with document 2; as shown in Fig. 3 and Fig. 19, at the time of hot-stamping, shutter is open. Then in conjunction with withdrawal of cassette 1 from document 2, current flow to solenoid 52 is stopped to close shutter 6. By this means, as carrier film is being pulled upwards, hot-stamping foil tape 3 can be peeled from document 2 by shutter 6, as in embodiment described above.

**[0093]** Further, an actuator used in opening/closing of shutter 6 is not limited to one using solenoid 52, for example, it is of course possible to use a motor such as stepper motor and the like as actuator. In this case, it is possible to optionally adjust the timing of opening/closing of shutter 6 and speed. Further, for example, it is possible to have separate drives for shutter 6 and movement to pull up carrier film, so that optimal peeling conditions matching foil properties can be set by the user through the control section. There is a possibility that peeling conditions change for holographic foil depending on aluminum vapor deposition layer and adhesive layer; when peeling conditions are not optimal, there is concern that breaks and misses occur in holographic foil; therefore, to provide high quality hot-stamping with foil in market distribution, it is efficacious to set optimal peeling conditions.

**[0094]** Next, there is provided an explanation relating to hot-stamping foil tape cassette and control method for hot-stamping foil tape cassette for simple and, moreover, appropriate control of hot-stamping foil such as holographic foil and the like.

**[0095]** Below, the constitution of this invention is explained in detail based on an embodiment shown in the figures.

**[0096]** One embodiment of hot-stamping foil tape cassette of this invention and control method for hot-stamping foil tape cassette is shown in Fig. 21 to Fig. 28. This hot-stamping foil tape cassette 201 has stored in cassette case hot-stamping foil tape 202 that is transferred to value-added medium together with value-added medium when pressure is applied, non-contacting tag 203 is provided that records control information.

**[0097]** Non-contacting tag 203 comprises, for exam-

ple, RFID (Radio Frequency ID). Hot-stamping device 204 is provided with communication function that communicates with non-contacting tag 203. Communication function constitutes, for example, antenna 207 that radiates electromagnetic waves to non-contacting tag 203 and simultaneously conducts data transmission with non-contacting tag 203, and circuit 208 that comprises interface between antenna 207 and transmitter-receiver controller 209, and transmitter-receiver controller 209 that controls communication with non-contacting tag 203, and control section 210 that issues command to refresh control information in non-contacting tag 203 according to need, at the same time, controls hot-stamping device 204 on basis of control information transmitted from non-contacting tag 203.

**[0098]** Non-contacting tag 203 is provided with communication device 205 that communicates with hot-stamping device 204 without contact, and memory device 206 that records and stores control information. Further, for example, non-contacting tag 203 in this embodiment comprises passive type tag that does not need external power source, and obtains power for action from antenna 207 provided on hot-stamping device 204. **[0099]** Memory device 206 comprises, for example, non-volatile memory, use of rewritable non-volatile memory such as EEPROM (Electrically Erasable Programmable Read Only Memory) or FRAM (Ferroelectric RAM, ferroelectric memory), flash memory and the like is preferred (hereinafter, in this embodiment, memory device is termed memory 206).

**[0100]** Communication device 205 includes electric power reception and data transmission coil, control information recorded in memory 206 is read, data is transmitted toward antenna 207 through this coil. Further, communication device 205 receives electromagnetic waves emitted from antenna 7, and recovers. Then, communication device 205 refreshes control information recorded on memory 206, on the basis of this received signal.

**[0101]** There are no particular limitations on form of non-contacting tag 203, there can be plurality of forms such as rod-shape and compressed coin-shape.

**[0102]** Non-contacting tag 203 in this embodiment, for example, is installed at a position facing antenna 207 when cassette 201 is set in hot-stamping device 204, buried in cassette 201. In other words, non-contacting tag 203 is positioned in close proximity to antenna 207, to enable satisfactory communication between non-contacting tag 203 and hot-stamping device 207.

**[0103]** Control information recorded in memory 206 in this embodiment, for example, contains identification information (hereinafter, termed tape ID information) for hot-stamping foil tape 202 stored in cassette 201, approved cycle number for stamping (hereinafter, termed approved stamping cycle number), information to perform optimal hot-stamping according to hot-stamping foil tape 202 (hereinafter, termed stamping condition information), information to manage cassette 201 itself



process, for example, alarm is sounded and process is ended upon determination that fraudulent cassette 201 or ID card 211 is attached to hot-stamping device 204, or is not attached properly, hot-stamping is not implemented.

[0116] Next, control section 210 implements cassette 211 identification process (Step 3). First, from tape ID information, it is decided whether hot-stamping foil tape 202 is custom type or general type (Step 301). When cassette 201 is a custom type (Step 301; Yes), tape ID code recorded on non-contacting tag 203 is checked to see whether it is included in approved ID code registered on ID card 211 (Step 302). If it is not included (Step 302; No), control section 210 implements alarm process (Step 303). In the alarm process, for example, by audible alarm or message display, the user is informed cassette 201 set therein cannot be used by this hot-stamping device 204, the process is ended, hot-stamping is not implemented. On the other hand, when tape ID code recorded on non-contacting tag 203 is included in approved ID code recorded on ID card 211 (Step 302; Yes), it proceeds to the next process (Step 4). Further, when hot-stamping foil tape 202 is a general type (Step 301; No), it proceeds to the next process (Step 4) without checking tape ID code.

[0117] Next, control section 210 implements a process to check approved stamping cycle number (Step 4). When approved stamping cycle number is 0 (Step 401; Yes), control section 210 implements alarm process (Step 402). In an alarm process, for example, by audible alarm or message display, the user is informed that this cassette 201 has already reached approved stamping cycle number, the process is ended, hot-stamping is not implemented. On the other hand, when approved stamping cycle number is not "0" (Step 401; No), it proceeds to the next process (Step 5).

[0118] Next, control section 210 implements a process to check whether stamping condition information specified in control information is suitable for hot-stamping device 204 or is in range where adjustment can be made to make it suitable (Step 5). If hot-stamping device 204 is deemed unsuitable (Step 501; No), control section 210 implements alarm process (Step 502). In alarm process, for example, by audible alarm or message display, the user is informed that this cassette 201 is not suitable for this hot-stamping device 204, the process is ended, hot-stamping is not implemented. As example of unsuitability, the stamping size mounted on device 204 may be larger than the stamping size indicated in control information as suitable for hot-stamping foil. On the other hand, when the stamping condition information is deemed suitable for hot-stamping device 204 (Step 501; Yes), it proceeds to the next process (Step 6).

[0119] Next, control section 210 implements a process of granting authorization to user of hot-stamping device 204 (Step 6). When the user ID and password are registered on ID card 211 (Step 601; Yes), the user is asked to input user ID and password, key input of user

ID and password are received by input device not shown in figure (Step 602). When the user ID is registered on ID card 211, and, moreover, input password corresponds correctly to this user ID (Step 603; Yes), it proceeds to the next process (Step 7). If the user ID, password are illegal (Step 603; No), control section 210 implements the alarm process (Step 604). In the alarm process, for example, the user is given an opportunity to input user ID and password for a set number of times; if there is no correct input, the process is ended, hot-stamping is not implemented. Further, if the user ID and password are not registered on ID card 211 (Step 601; No), without requiring user ID and password, it proceeds to the next process (Step 7).

[0120] Next, control section 210 implements hot-stamping process (Step 7). When the presence of value-added medium that is the stamping object at predetermined stamping position is detected (Step 701; Yes), moreover, the user pushes the start button (Step 702; Yes), then control section 210, according to stamping condition information on non-contacting tag, implements stamping at designated optimal temperature, optimal pressure application, and optimal time (Step 703). Then, "1" is subtracted from approved stamping cycle number in memory 206 in non-stamping tag 203, this approved stamping cycle number is refreshed (Step 704).

[0121] Then, hot-stamping device 204 winds up hot-stamping foil tape 202 equivalent to one sheet of value-added medium to finish process.

[0122] Next, hot-stamping foil tape cassette 201 of this invention and control method for hot-stamping foil tape cassette 201 are explained by one embodiment in which these are utilized.

[0123] In Fig. 21, hot-stamping foil tape 202a, for example, is holographic foil tape in general use. Cassette 201a in which hot-stamping foil tape 202 is stored is general-use type cassette. Flag indicating that holographic foil tape 202 is general-use type is recorded on non-contacting tag 203a as well, further, tape ID code, for example, "00000" is recorded.

[0124] Hot-stamping foil tape 202b, for example, comprises holographic foil tape for Customer A and Customer C. Cassette 201b that stores hot-stamping foil tape 202b is custom-type cassette for use by Customer A and Customer C. In non-contacting tag 203b, a flag is recorded that designates holographic foil tape 202 as a custom-type, further, tape ID code, for example, "00001" is recorded.

[0125] Hot-stamping foil tape 202c, for example, comprises holographic foil tape for Customer B and Customer C. Cassette 201c that stores hot-stamping foil tape 202c is custom-type cassette for use by Customer B and Customer C. In non-contacting tag 203c, a flag is recorded that designates holographic foil tape 202 as a custom-type, further, ID code, for example, "00002" is recorded.

[0126] Customer A, Customer B, Customer C, for ex-



long as these are within the range of the gist of this invention.

**[0139]** For example, for user authorization, there is no need to restrict only to key input by user of user ID and password. For example, user authorization card 214 (for example, employee ID) that users have individually, can be constructed in RFID, user ID and password can be recorded on user authorization card 214. Then, as shown in Fig. 29, at the time of user authorization, user authorization card 214 together with ID card 211 is positioned in close proximity to antenna 207; through antenna 207, control section 210 of hot-stamping device 204 and user authorization card 214 establish communication to check whether user ID and password recorded on user authorization card 214 is registered on ID card 211, authorization to this user can be granted in this way.

**[0140]** Further, instead of non-contacting tag 203 described above, it is possible, for example, to utilize contacting tag provided with an IC contact point, further, instead of ID card 211 constructed using RFID, to utilize, for example, contacting IC card provided with an IC contact point. However, in this case, instead of sharable antenna 7, it is necessary to provide hot-stamping device 204 with 2 IC contact point blocks to establish communication with contacting tag and IC card.

**[0141]** Further, for example, recording medium 211 that records and stores device/user information is not restricted to being constructed as a card-shape RFID, for example, it can be a recording medium that is provided on hot-stamping device 204, such as a non-volatile memory and the like, that is read-writable by control section 210.

**[0142]** Further, as application of this invention, for example, it is possible to mount a non-contacting tag that can communicate with hot-stamping device 204 on part connected with hot-stamping device 204. For example, it is possible to mount non-contacting tag on the stamping section itself, so the stamping area and size information can be transferred reliably to the body of hot-stamping device 204.

**[0143]** It is clear from the above explanation that hot-stamping foil tape cassette described has a shutter that except at the time of hot-stamping transfer, protects hot-stamping foil tape, after hot-stamping; by means of the shutter, hot-stamping foil tape is peeled from the value-added medium, therefore, hot-stamping foil tape is protected by the shutter from physical damage such as dirt, heat, cuts and scratches, etc., continually satisfactory hot-stamping can be provided. Furthermore, at the time of hot-stamping when the shutter is opened and after hot-stamping when the shutter is closed again, the shutter can be inserted between the hot-stamping foil tape and the value-added medium to peel the hot-stamping foil tape from the value-added medium. Further, because the holographic foil is attached as a cassette-type, exchange of cassette can be implemented easily when there is changeover to a different hot-stamping foil

tape; exchange operations are very easy in comparison to conventional open reel structure.

**[0144]** Further, in peeling mechanism for hot-stamping device described at the time of hot-stamping, the shutter in the hot-stamping foil tape cassette is opened, on the other hand, after hot-stamping, as hot-stamping foil tape cassette is being withdrawn from the value-added medium, the shutter is closed simultaneously to peel the hot-stamping foil tape from the value-added medium; when the shutter is being closed, the shutter is inserted between hot-stamping foil tape and value-added medium, as hot-stamping foil tape is being pulled up from value-added medium, hot-stamping foil tape can be peeled from value-added medium consistently and, moreover, in satisfactory fashion. In this situation, there is no need to move value-added medium when hot-stamping foil tape is peeled from value-added medium, even when a document such as a brochure is hot-stamping object, damage to this document can be avoided. Furthermore, by linking the cassette movement mechanism that regardless of thickness of value-added medium enables cassette to come in contact with value-added medium at the time of hot-stamping, and opening/closing of shutter, it is possible to implement peeling of hot-stamping foil tape in a satisfactory fashion, continually, with identical optimal timing regardless of the kind of value-added medium, from single sheet to brochure.

**[0145]** Further, in the foil-peeling mechanism in the hot-stamping device described above, the cassette movement mechanism has a connection connecting to the shutter, the shutter is opened and closed by action of the cassette movement mechanism; consequently, without the need to provide an actuator for use in opening/closing separately as the hot-stamping foil tape is pulled up from the value-added medium, the shutter is inserted between the hot-stamping foil tape and the value-added medium, thus cassette withdrawal from the value-added medium and the shutter closing can be linked with optimal timing. Further, in a peeling method for hot-stamping foil described above, a hot-stamping foil tape cassette is used; at the time of hot-stamping, hot-stamping foil tape cassette is made to come in contact with the value-added medium and, moreover, the shutter in hot-stamping foil tape cassette is opened; after hot-stamping, as hot-stamping foil tape cassette is being withdrawn from value-added medium, the shutter is closed to peel hot-stamping foil tape from value-added medium; as hot-stamping foil tape is pulled up from value-added medium, shutter is inserted between hot-stamping foil tape and value-added medium, hot-stamping foil tape can be peeled reliably and, moreover, in a satisfactory fashion without damage to the value-added medium.

**[0146]** Non-contacting tag that records control information is provided in hot-stamping foil tape cassette described above, therefore, by confirming the presence of non-contacting tag and its validity, use of fraudulent hot-

## Claims

1. A hot-stamping foil tape cassette (1;201), comprising:

a hot-stamping foil tape (3; 202) transferred by pressure application together with a value-added medium (2) to said value-added medium (2); a windup reel (4) for winding up said hot-stamping foil tape (3);  
said reel on which said hot-stamping foil tape (3) is wound, being stored in a cassette case; and  
a shutter (6);  
said shutter (6) at a time of hot-stamping transfer, being in a protective position that protects said hot-stamping foil tape (3);  
said shutter (6) at the time of hot-stamping transfer withdrawing to a withdrawal position that does not interfere with action of said hot-stamping transfer;

wherein, after hot-stamping, by said shutter (6), said hot-stamping foil tape (3) can be peeled from said value-added medium (2).

2. A foil-peeling mechanism (15) for a hot-stamping device (7), being provided with a hot-stamping foil tape cassette (1) according to claim 1, and a cassette movement mechanism (14) that makes said hot-stamping foil tape cassette (1) come in contact with the value-added medium (2) at the time of hot-stamping and together with this, after hot-stamping, withdrawing said hot-stamping foil tape cassette (1) from said value-added medium (2), at the time of hot-stamping, said shutter (7) in said hot-stamping foil tape cassette (1) opens, and on the other hand, after hot-stamping, said shutter (7) is closed in conjunction with withdrawal of said hot-stamping foil tape cassette (1) from said value-added medium (2) to peel hot-stamping foil tape (3) from said value-added medium (2).
3. A foil-peeling mechanism (15) in a hot-stamping device (7) according to claim 2, wherein said cassette movement mechanism (14) has a connection (57) for connecting to said shutter (7), said shutter (7) being opened and closed by action of said cassette movement mechanism (14).
4. A hot-stamping foil peeling method using a hot-stamping foil tape cassette (1) according to Claim 1, comprising the steps of:

making said hot-stamping foil tape cassette (1) come in contact with the value-added medium (2) at the time of hot-stamping;  
opening the shutter (7) in said hot-stamping foil

tape cassette (1), after hot-stamping; and  
withdrawing the hot-stamping foil tape cassette (1) from said value-added medium (2), closing the shutter (7) to peel the hot-stamping foil tape (3) from said value-added medium (2).

5. A hot-stamping foil tape cassette (201; 201a; 201b; 201c), said hot-stamping foil tape cassette (201; 201a; 201b; 201c) that has stored in a cassette case hot-stamping foil tape (202; 202a; 202b; 202c) transferred by pressure application together with a value-added medium to said value-added medium, said cassette (201; 201a; 201b; 201c) being provided with a non-contacting tag (203; 203a; 203b; 203c) that records control information.
6. A control method for hot-stamping foil tape cassette (201; 201a; 201b; 201c), comprising the steps of:

providing a non-contacting tag (203; 203a; 203b; 203c) that records control information on a hot-stamping foil tape cassette (201; 201a; 201b; 201c);  
transferring hot-stamping foil tape (202; 202a; 202b; 202c) stored in a cassette case by pressure application together with a value-added medium to said value-added medium;  
providing said hot-stamping foil tape cassette (201; 201a; 201b; 201c) set on the hot-stamping device (204; 204A; 204B; 204C) with a communication function for communicating with said non-contacting tag (203); and  
said hot-stamping device (204; 204A; 204B; 204C) able to identify said hot-stamping foil tape cassette (201; 201a; 201b; 201c) on the basis of said control information.

7. The control method for hot-stamping foil tape cassette (201; 201a; 201b; 201c) according to Claim 6, comprising the steps of including in said control information, an approved stamping cycle number, refreshed by subtracting "1" each time hot-stamping is implemented, and, when said approved stamping cycle number is "0", said hot-stamping device does not implement hot-stamping.
8. The control method for hot-stamping foil tape cassette (201; 201a; 201b; 201c) according to Claim 6, comprising the step of including stamping condition information in said control information, said hot-stamping device (204; 204A; 204B; 204C) implementing hot-stamping according to said stamping condition information.
9. The control method for hot-stamping foil tape cassette (201; 201a; 201b; 201c) according to Claim 6, comprising the step of including tape identification code (termed ID code hereinafter) in said control in-

Fig.1

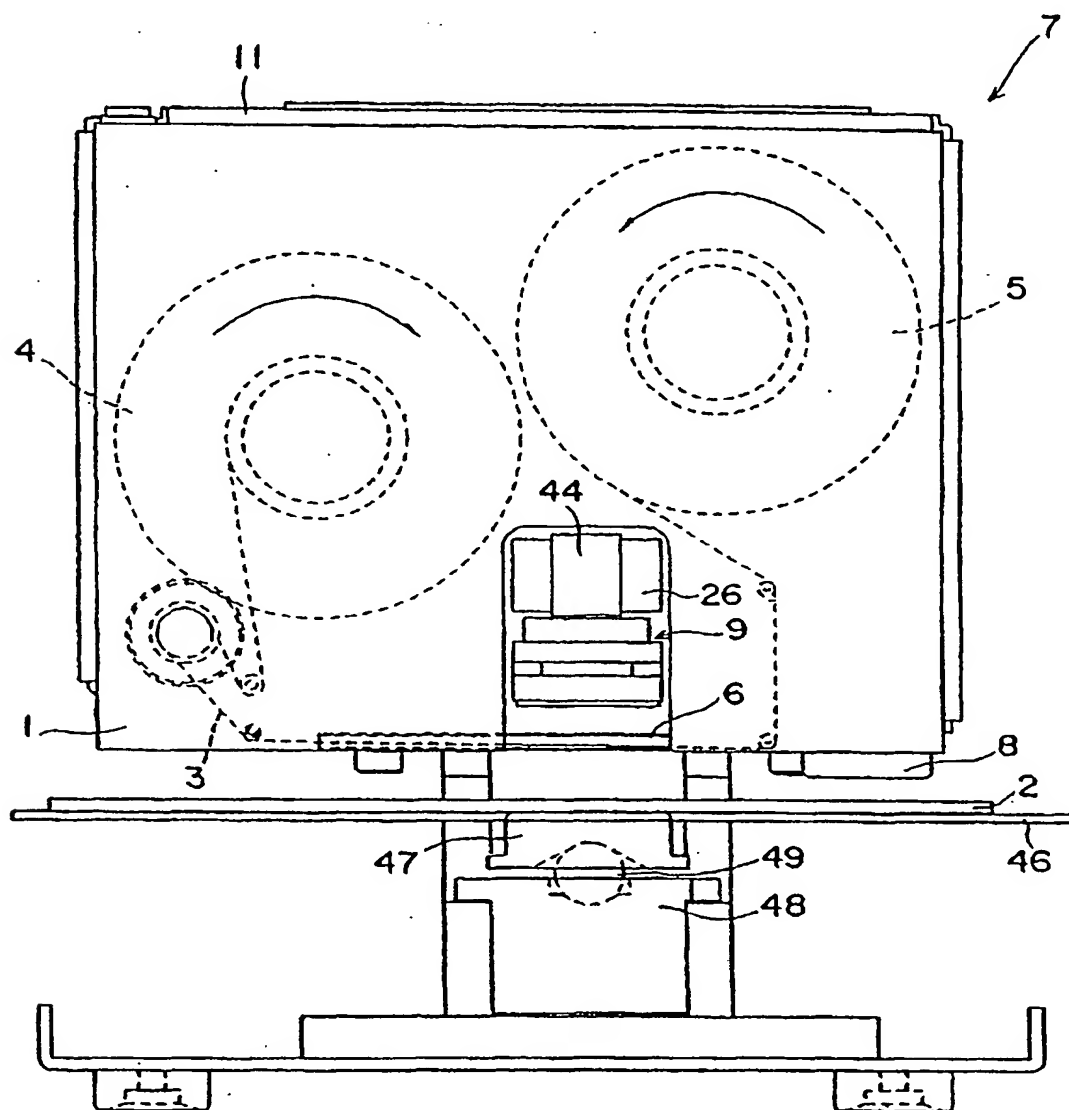


Fig.2

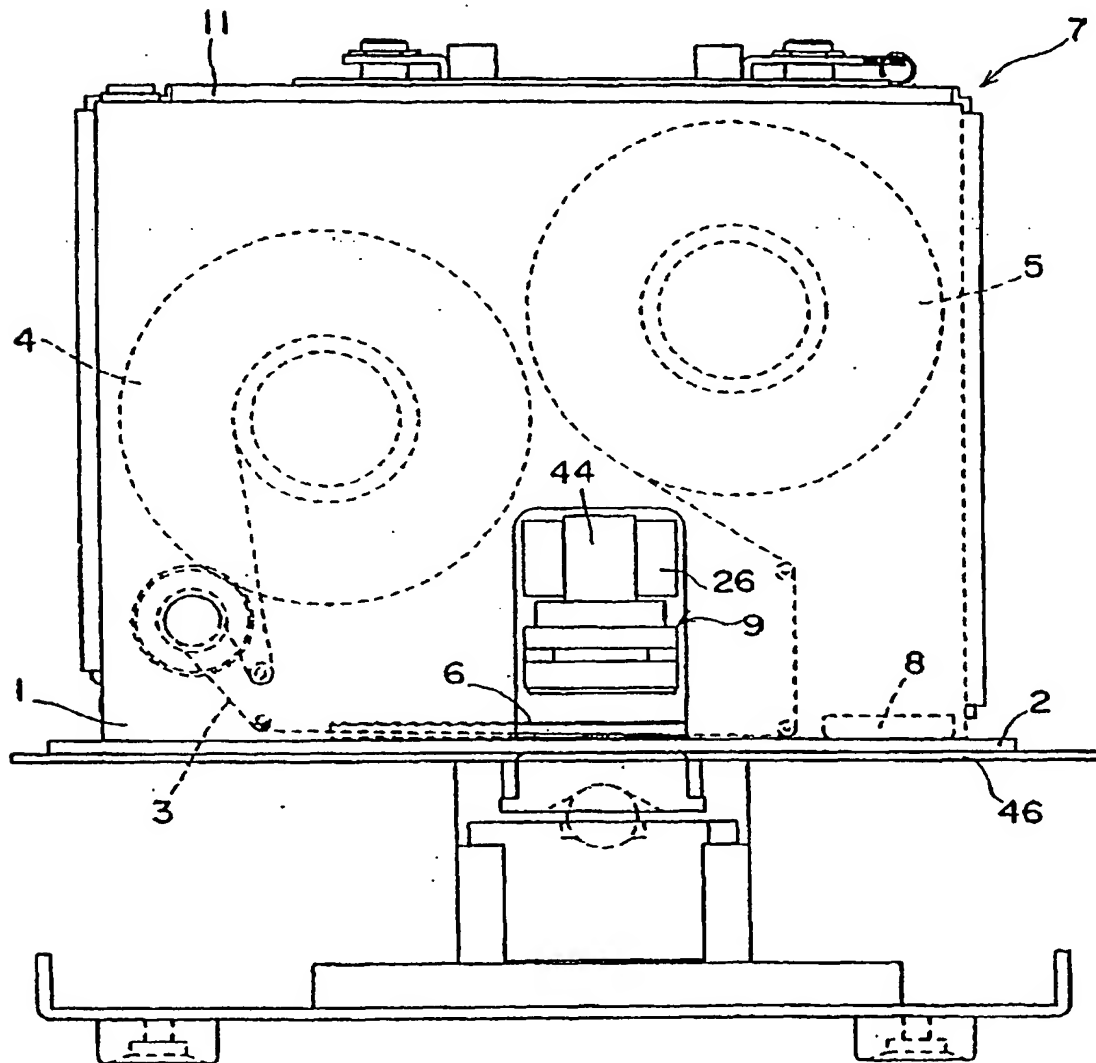


Fig.3

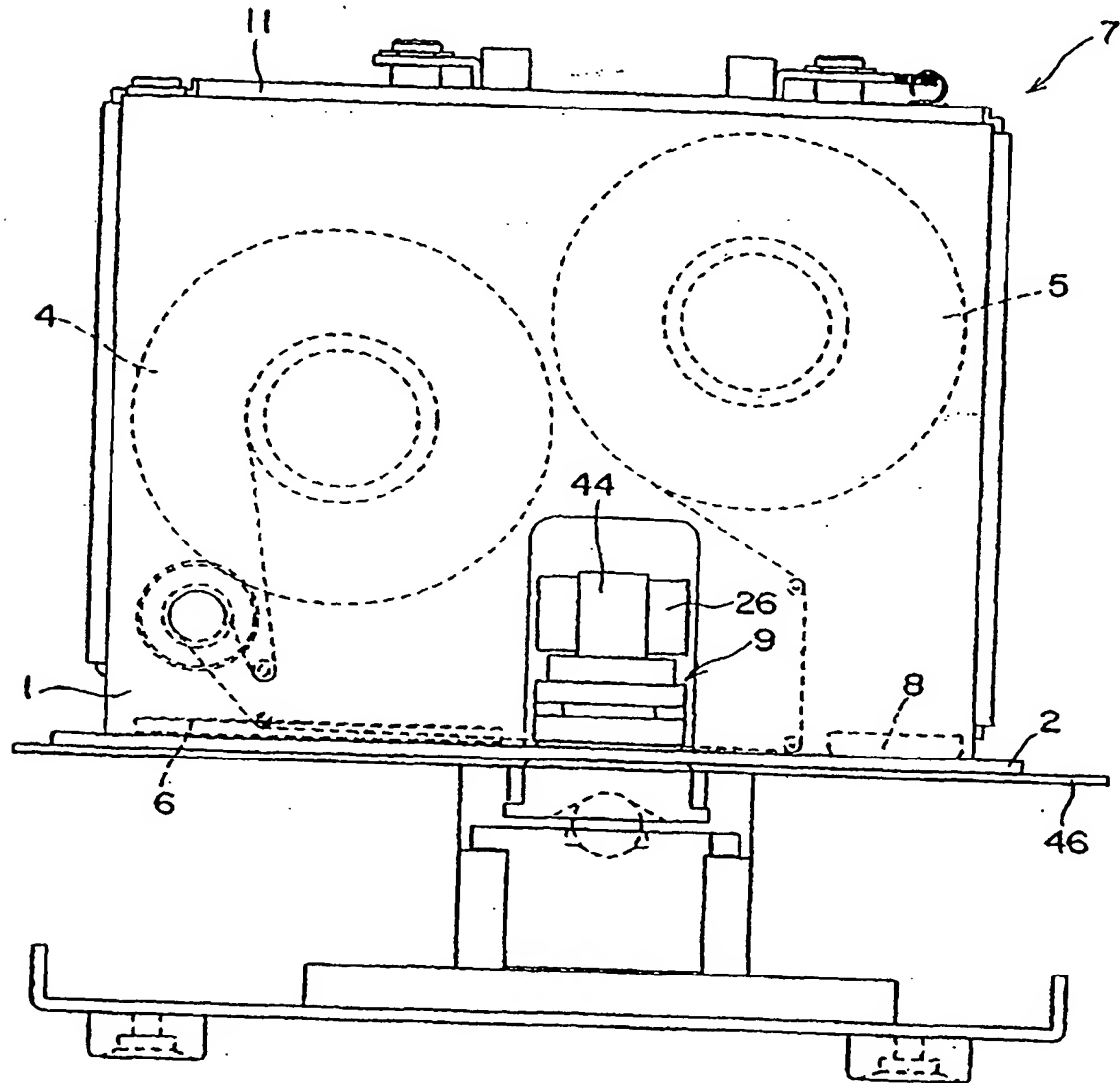


Fig.4

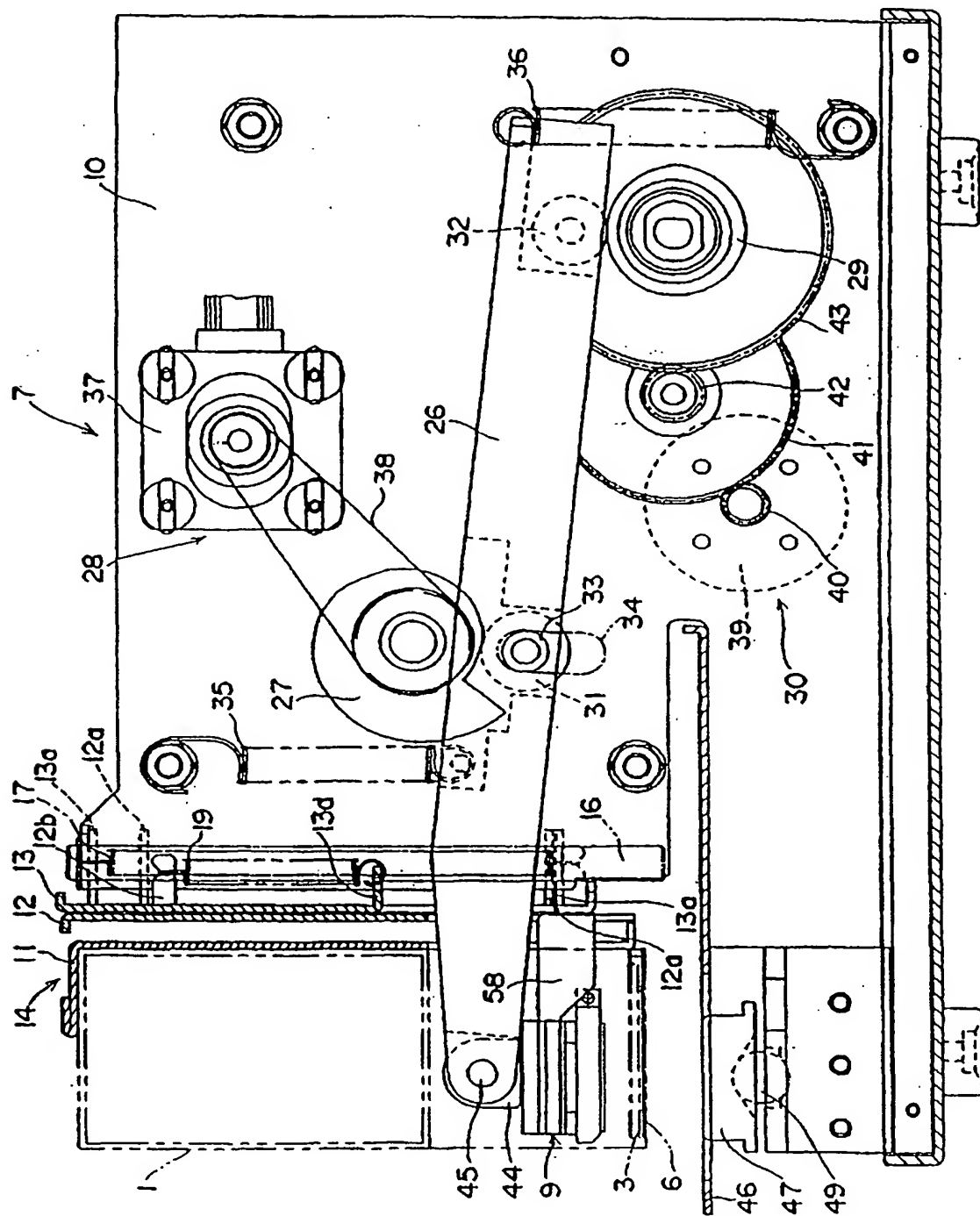


Fig.5

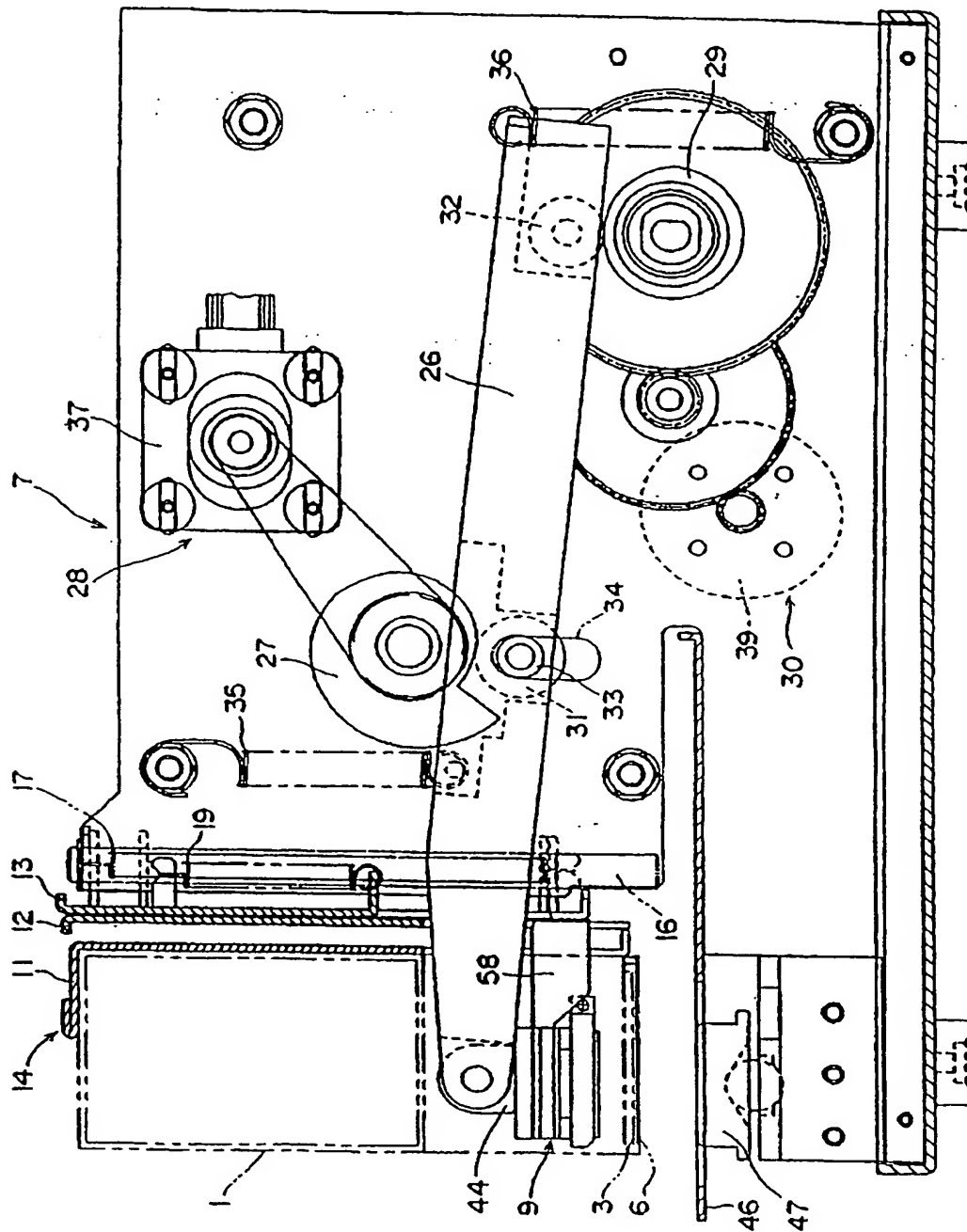




Fig.6

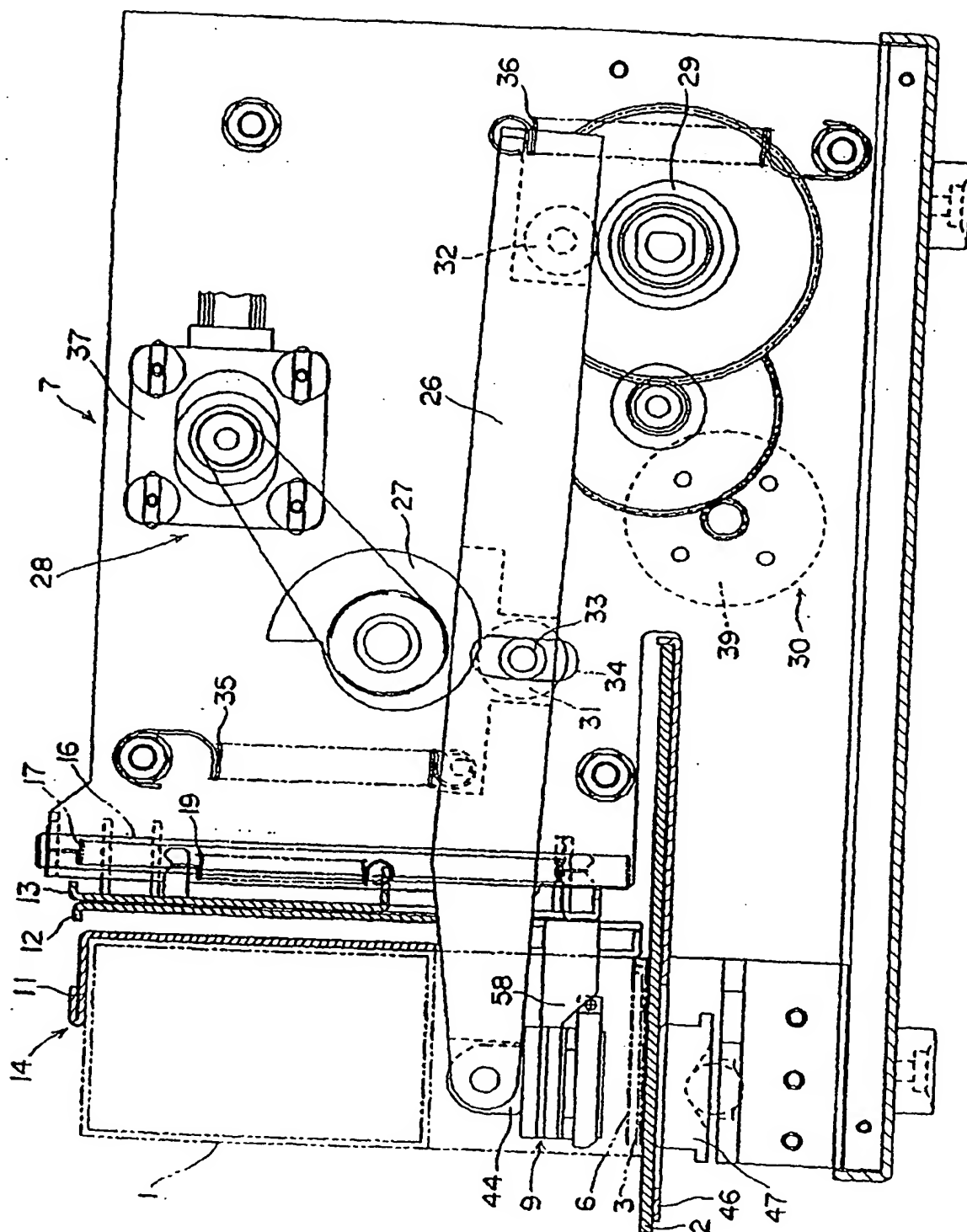


Fig.7

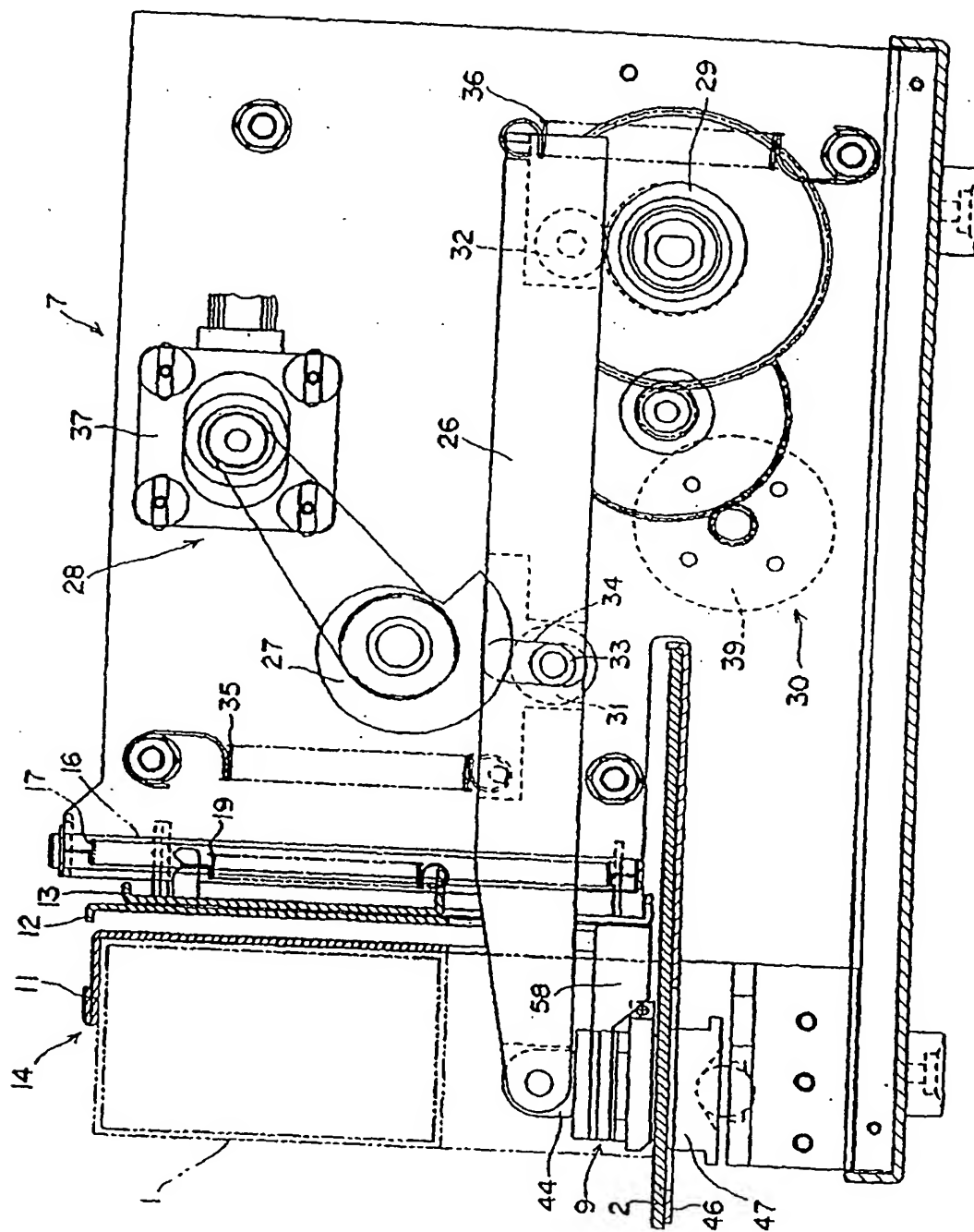


Fig.8

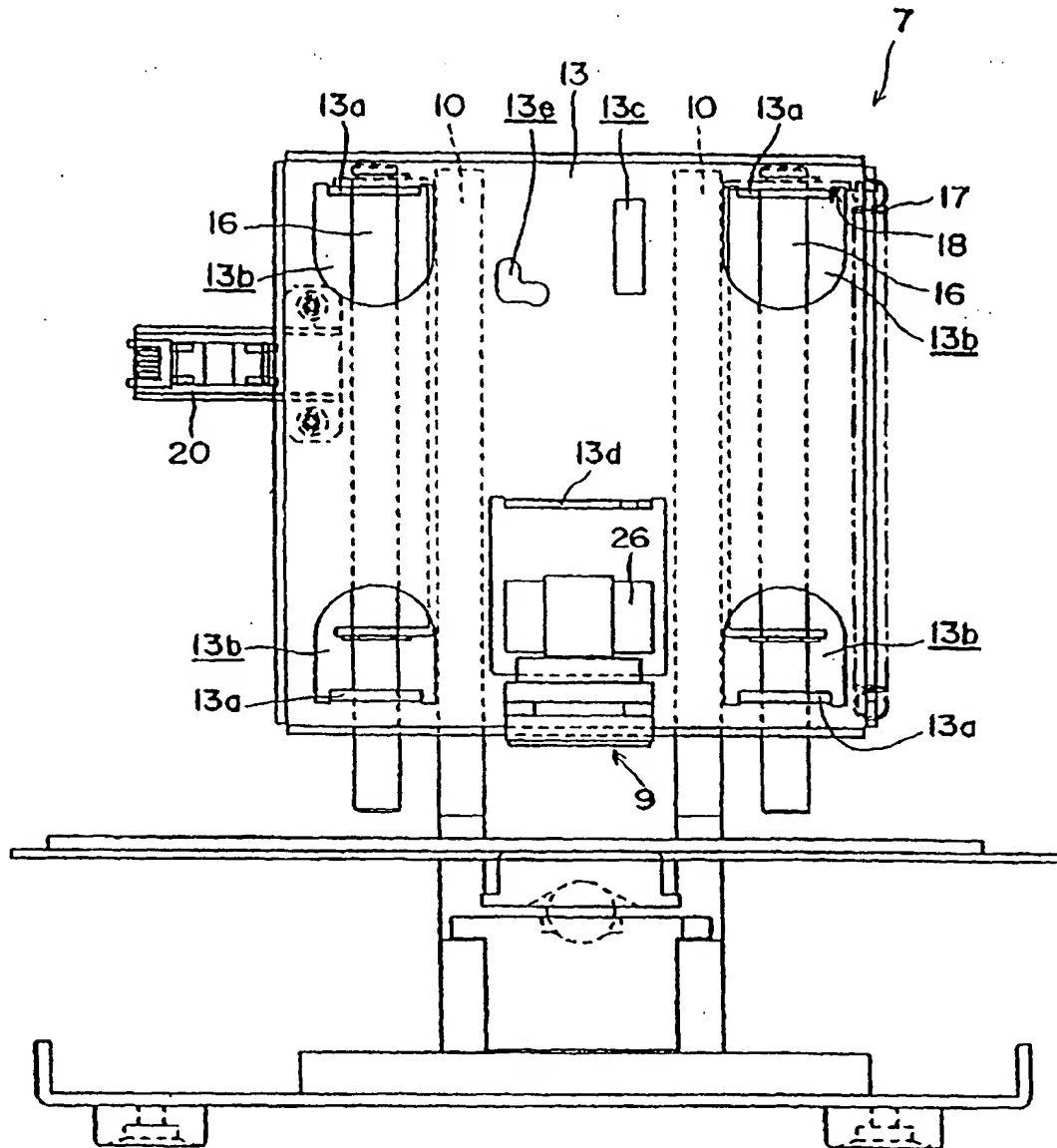


Fig.9

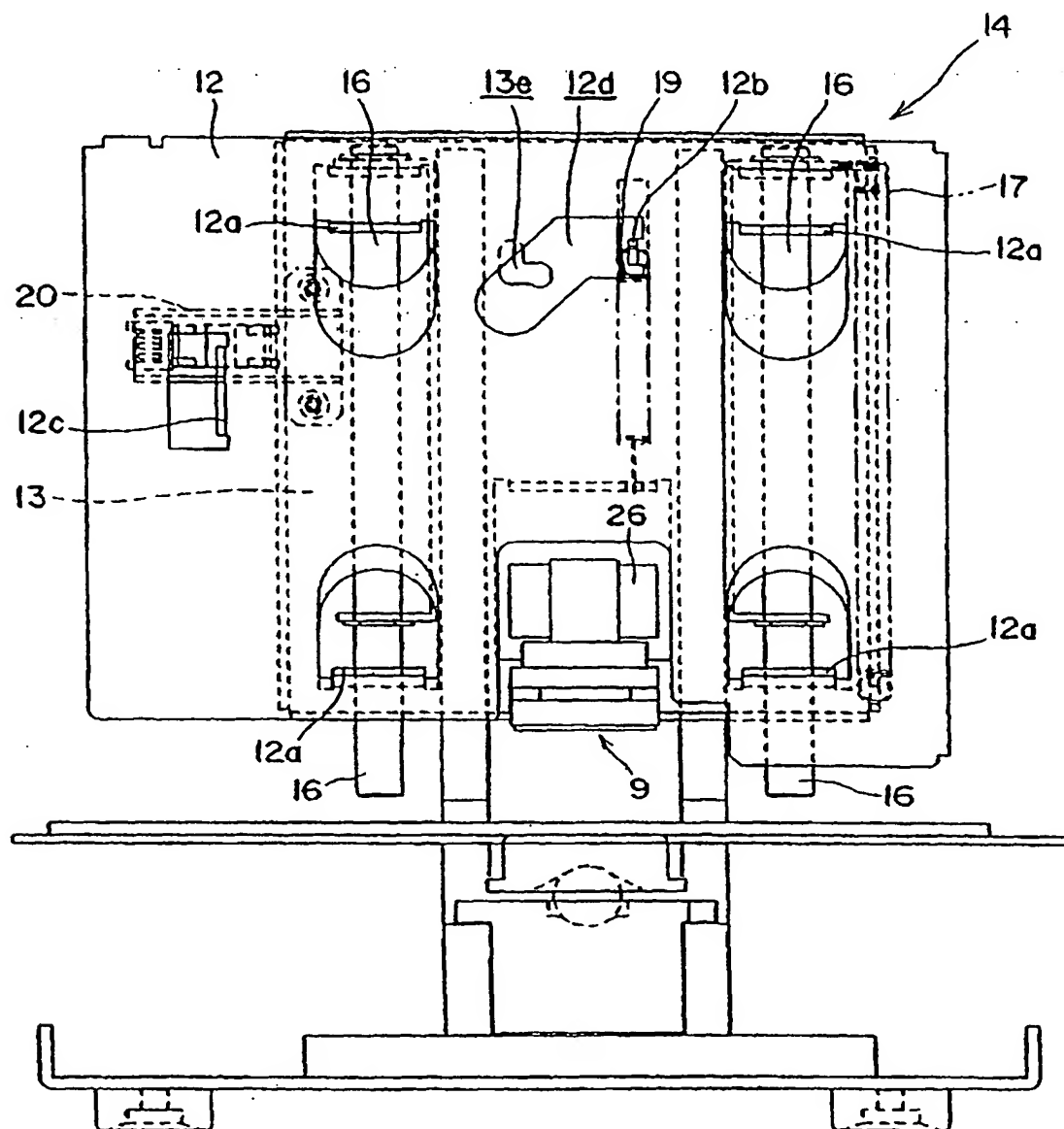


Fig.10

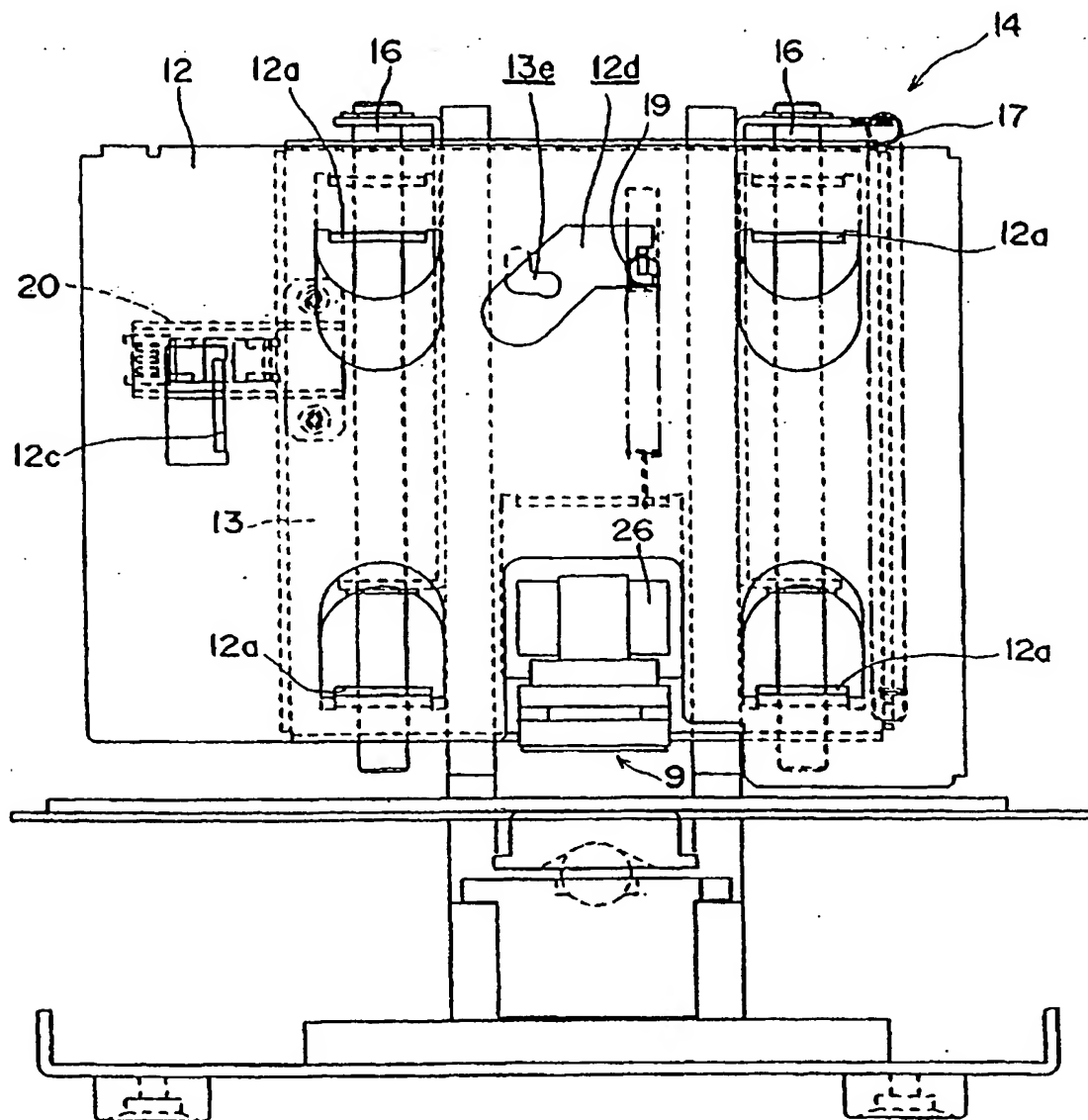


Fig.11

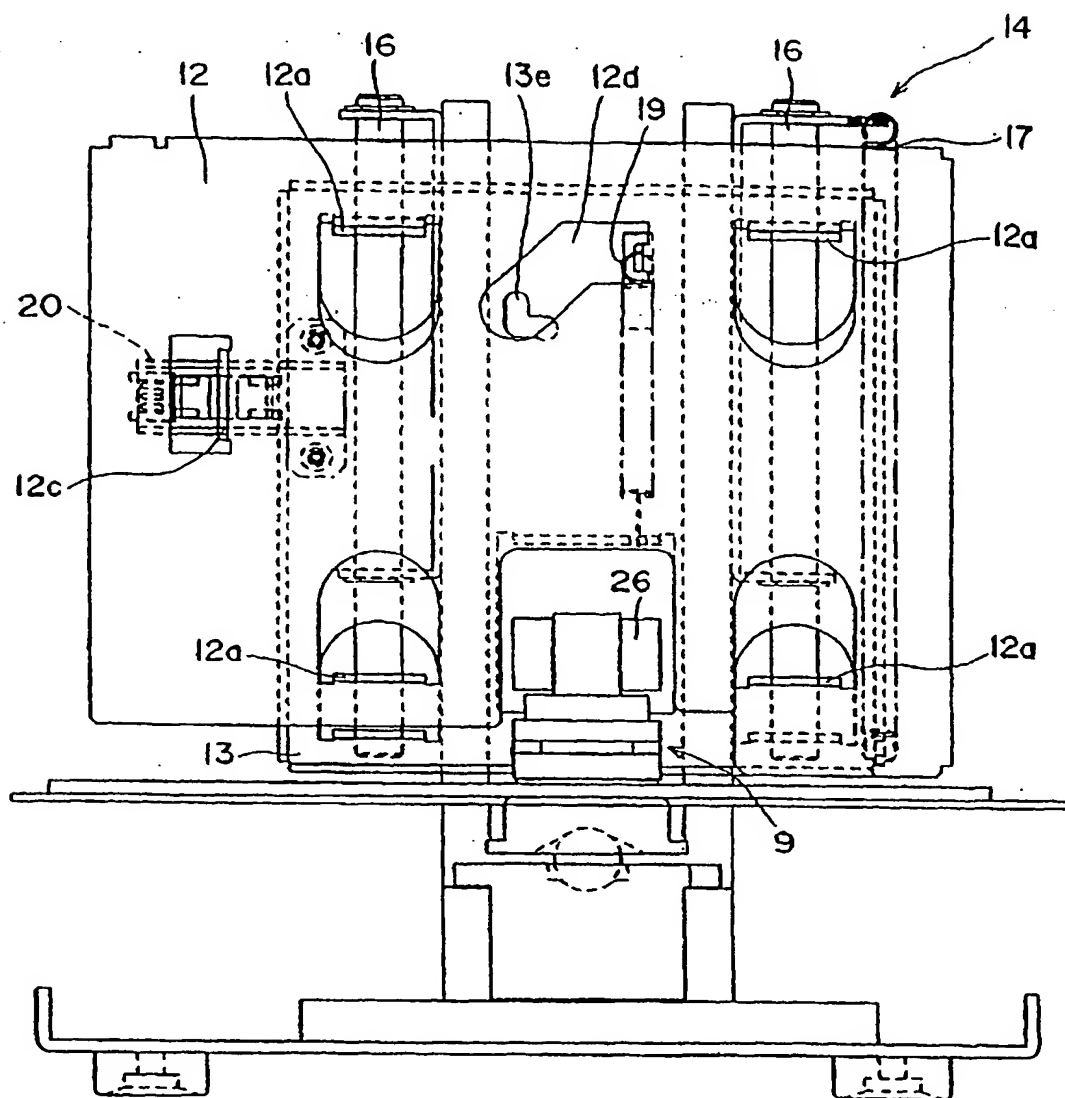


Fig.12

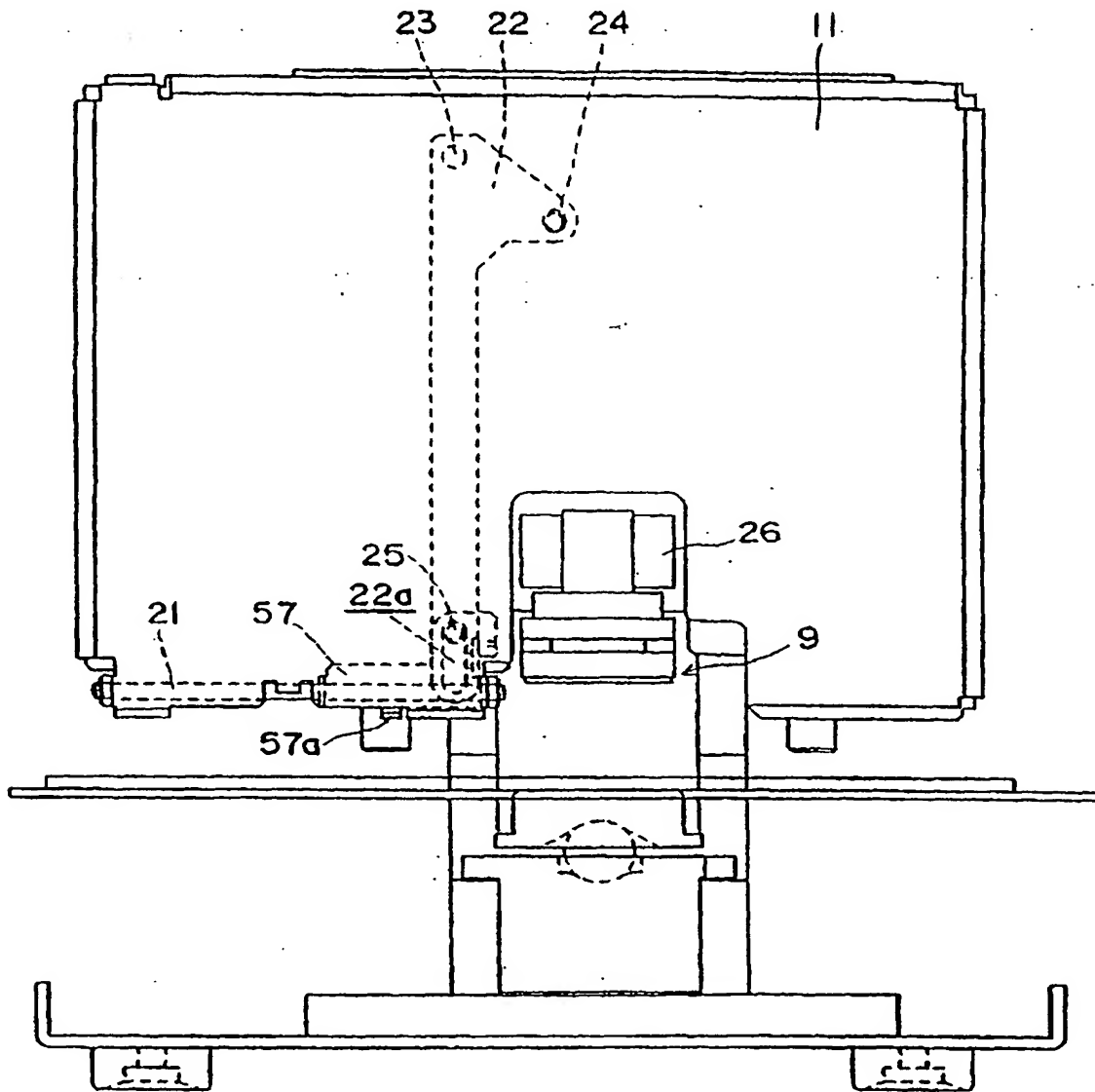




Fig.13

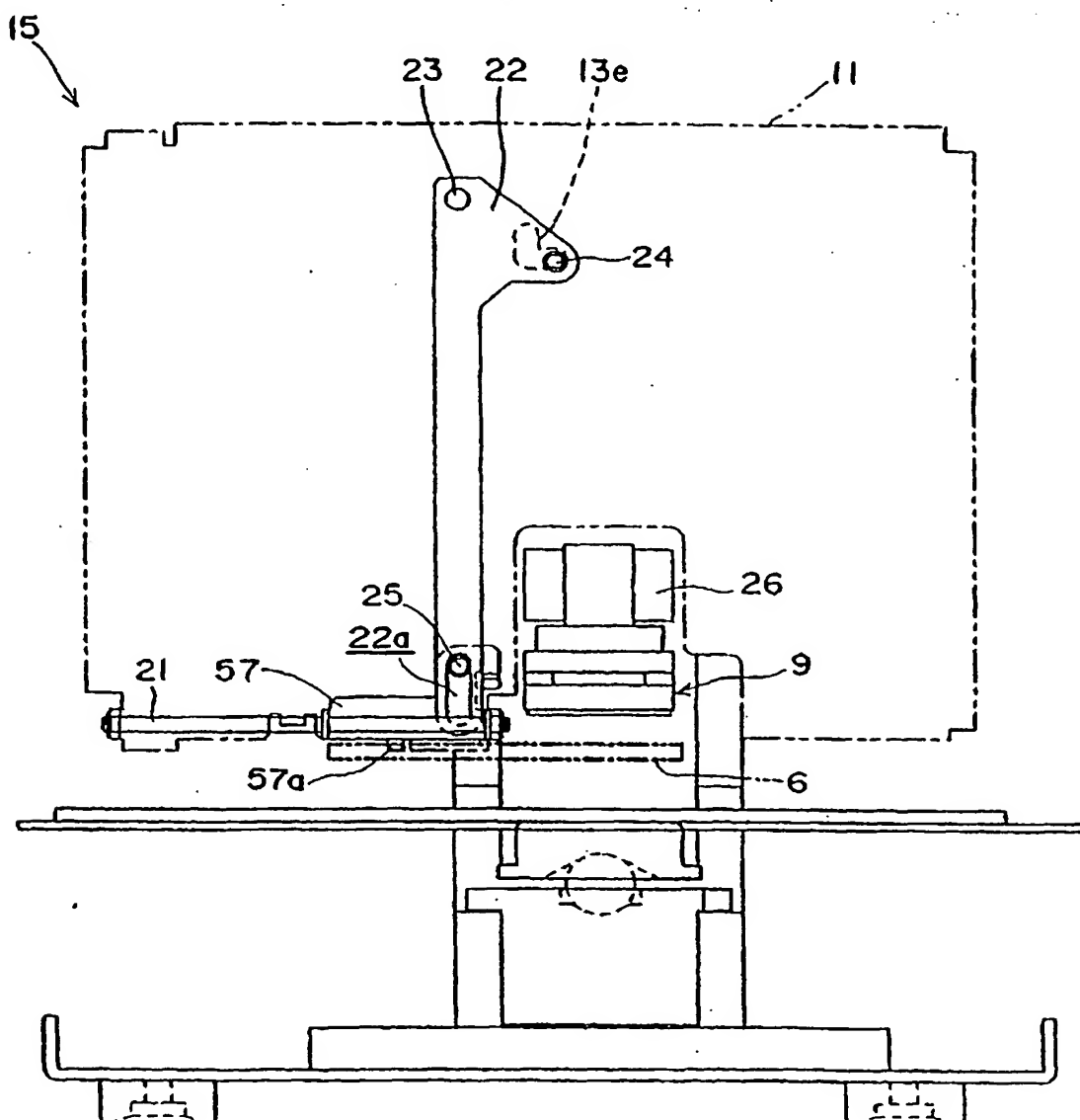


Fig. 14

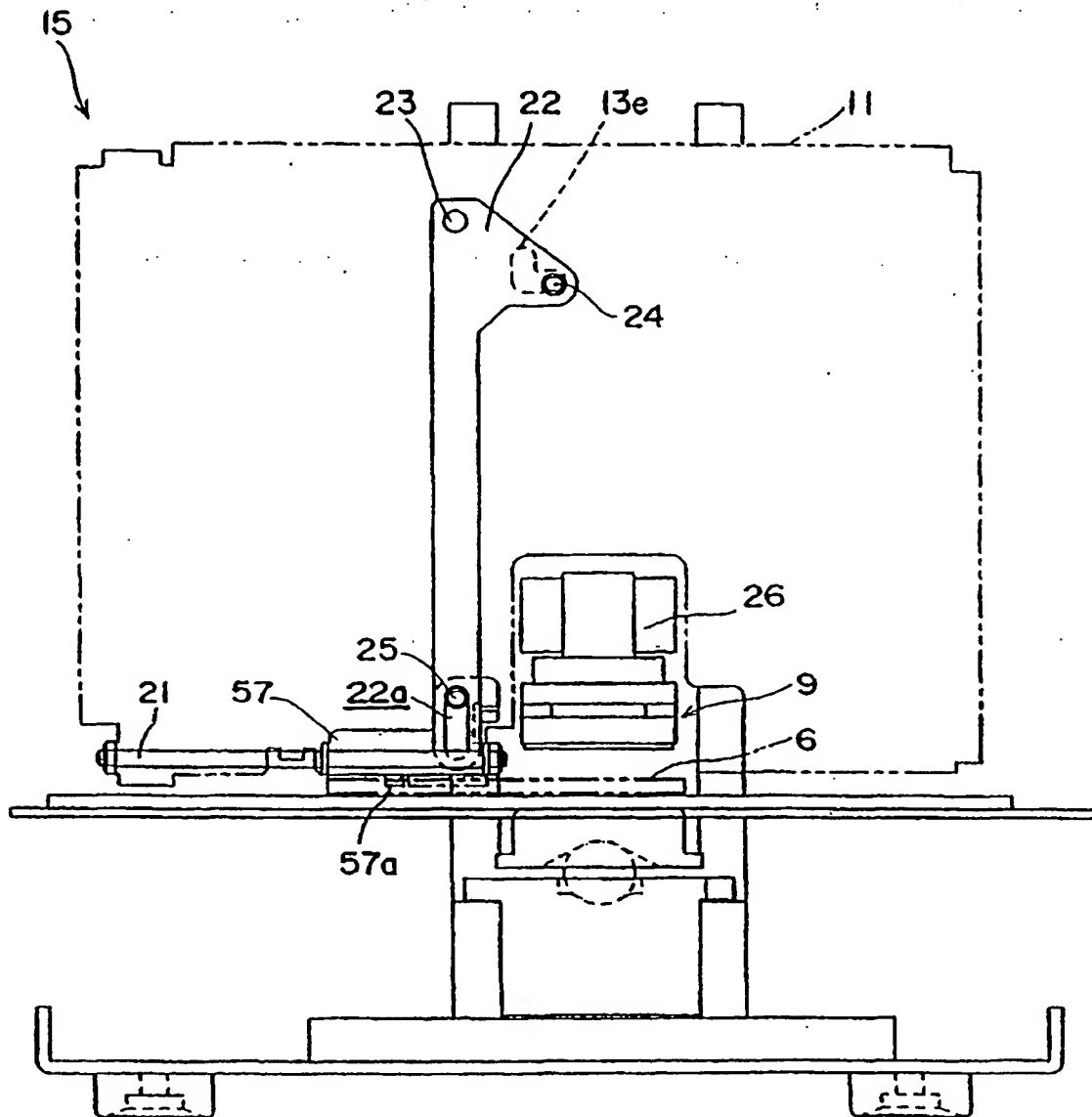


Fig.15

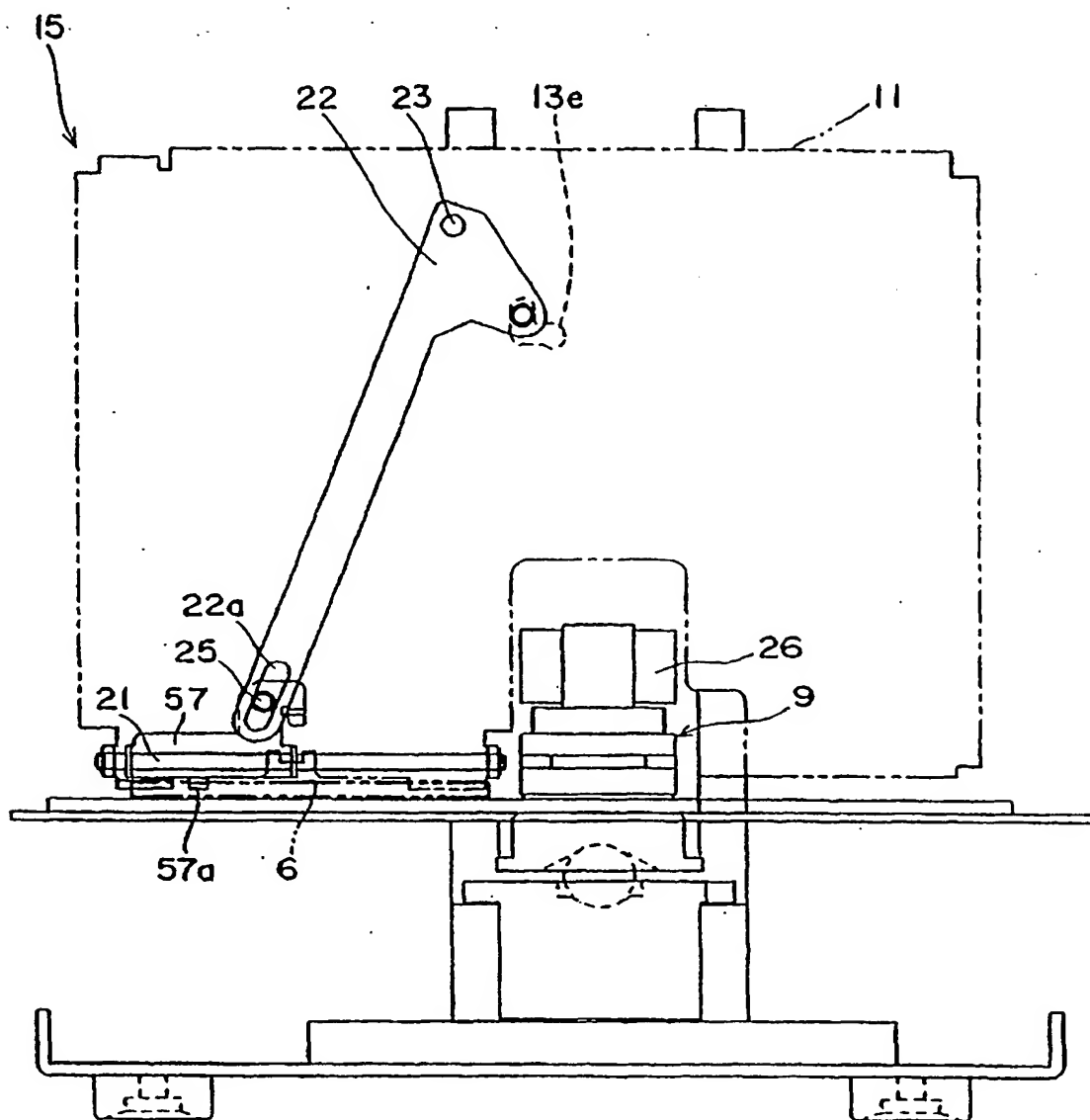


Fig.16

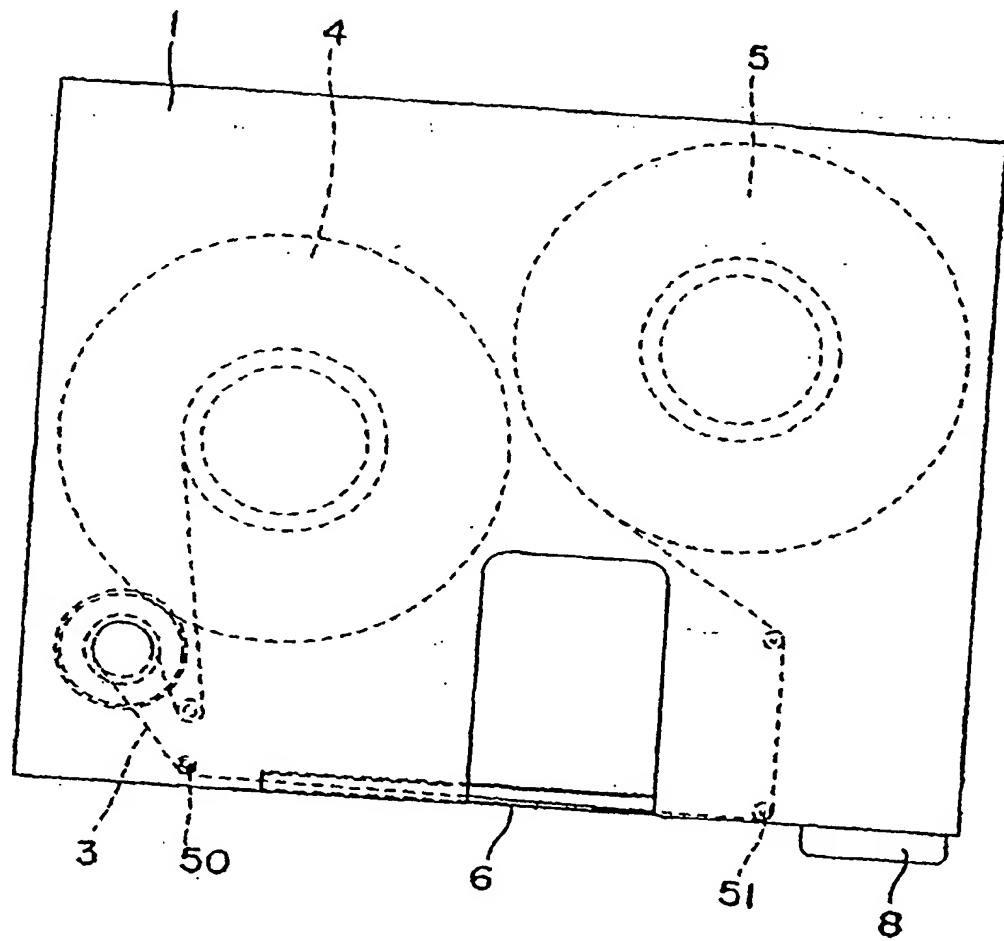


Fig.17

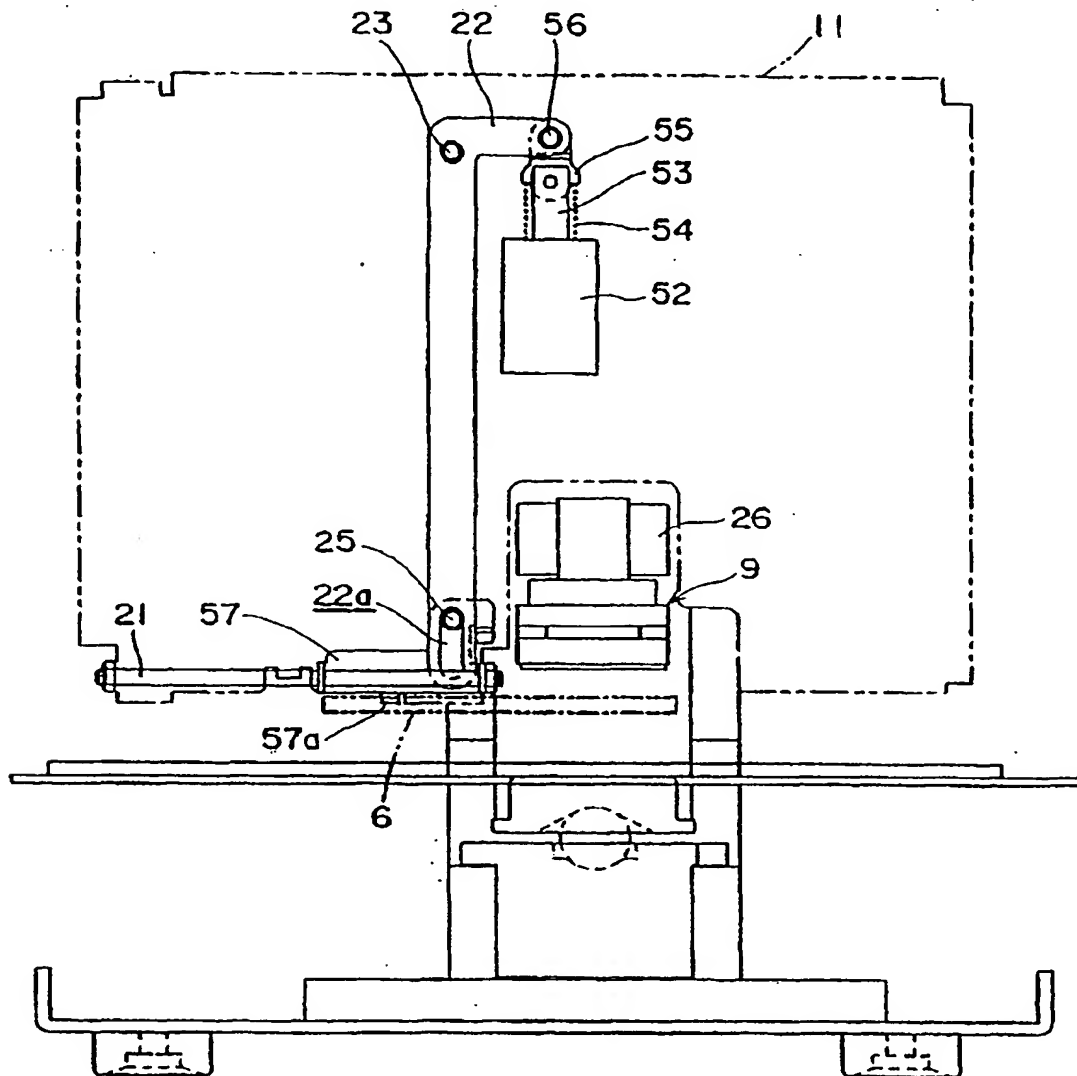


Fig.18

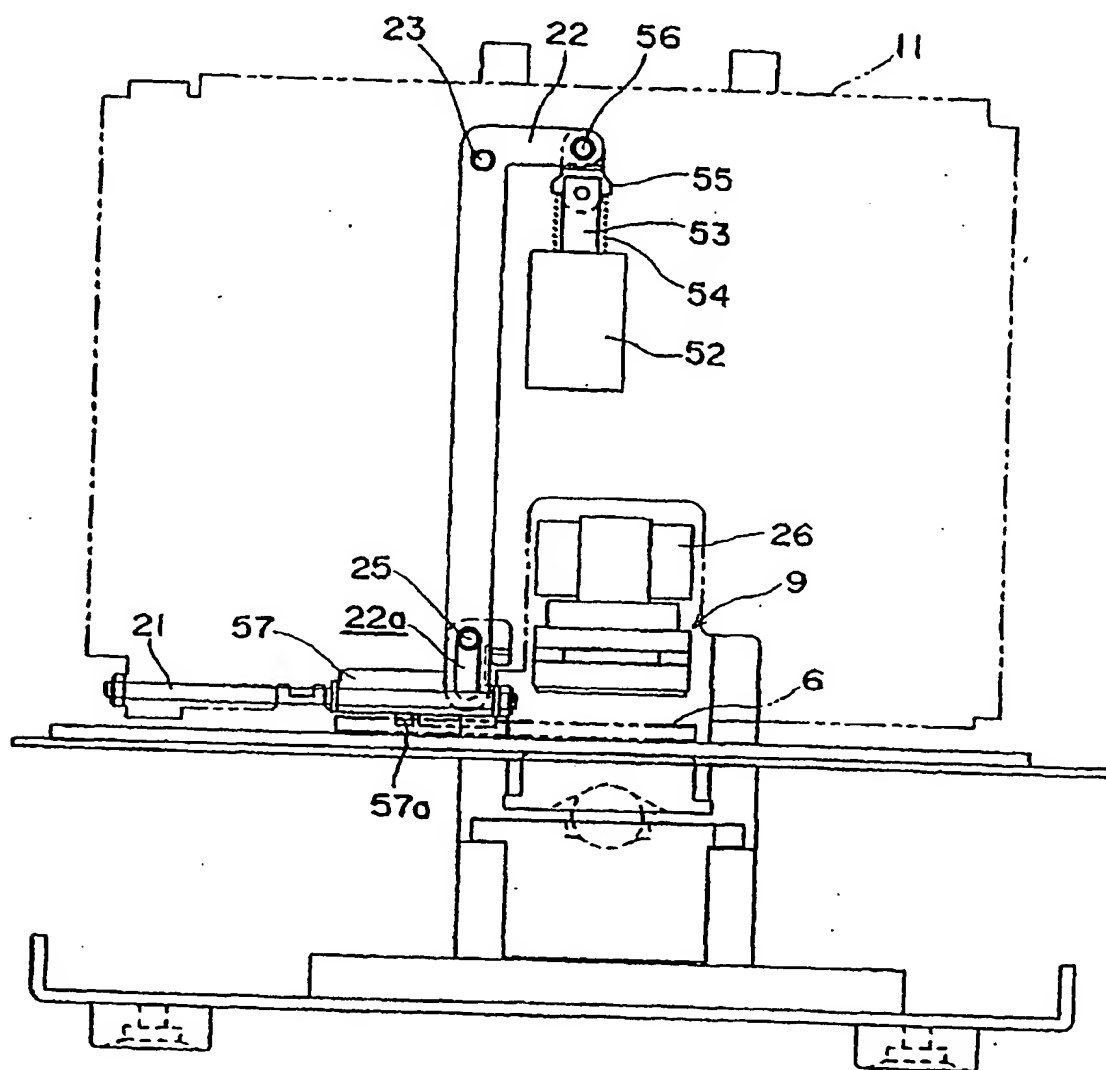


Fig.19

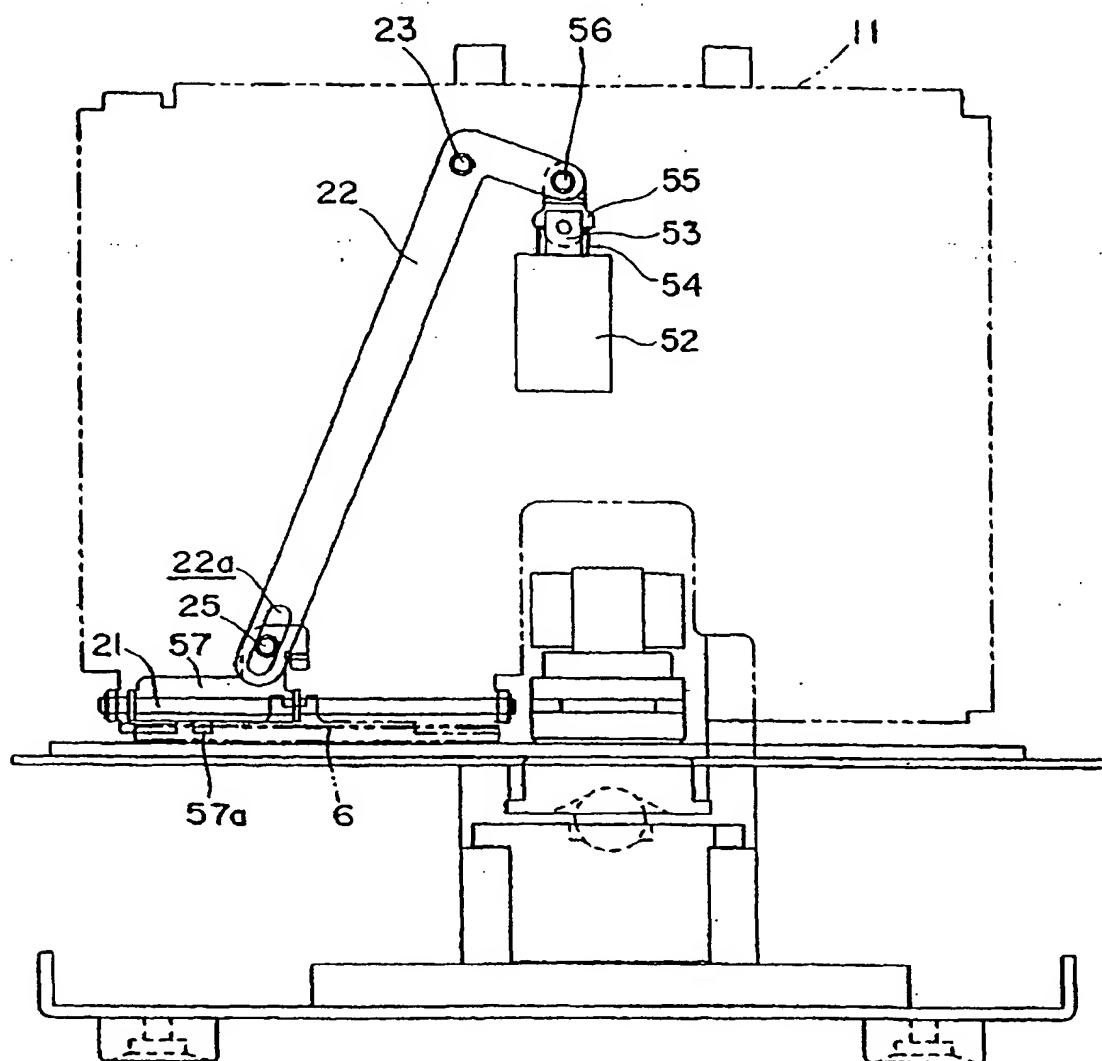




Fig.20

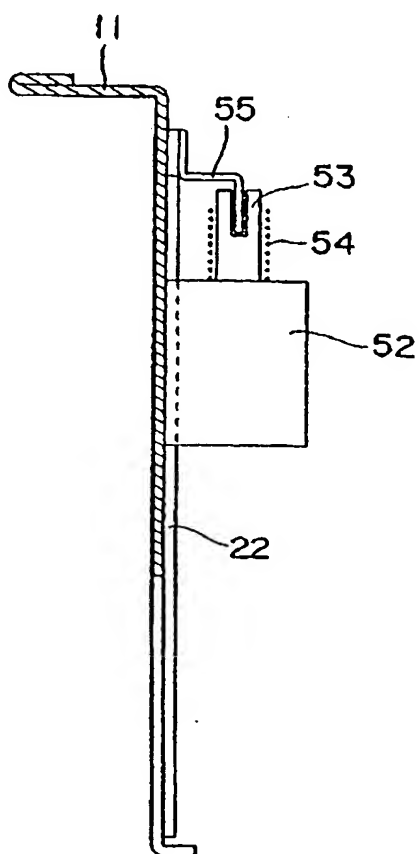


Fig.21

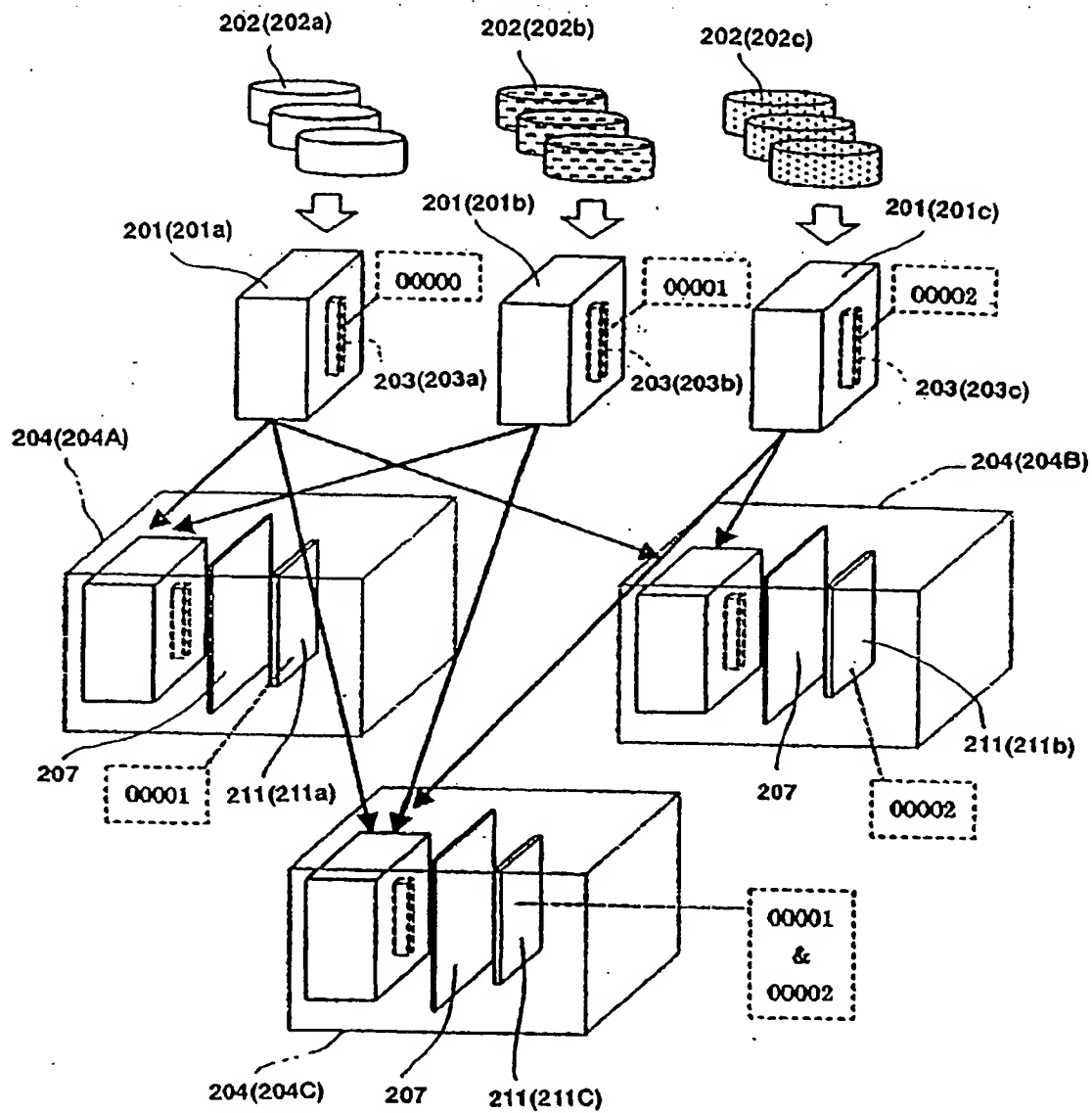


Fig.22

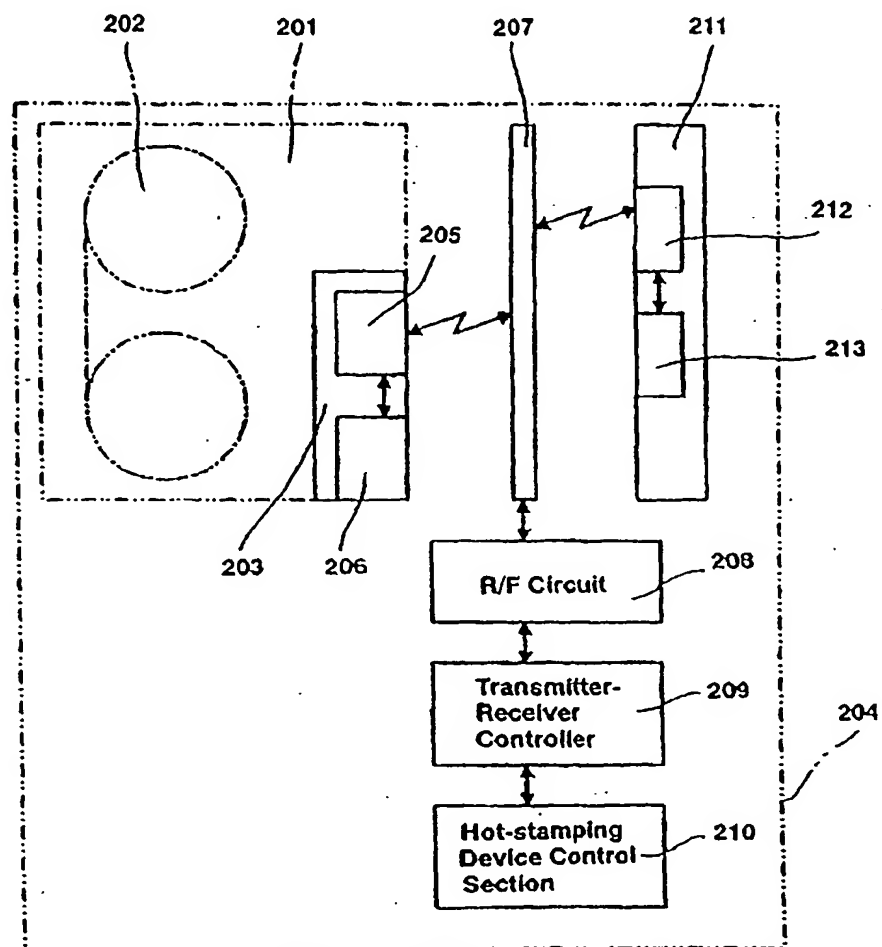


Fig.23

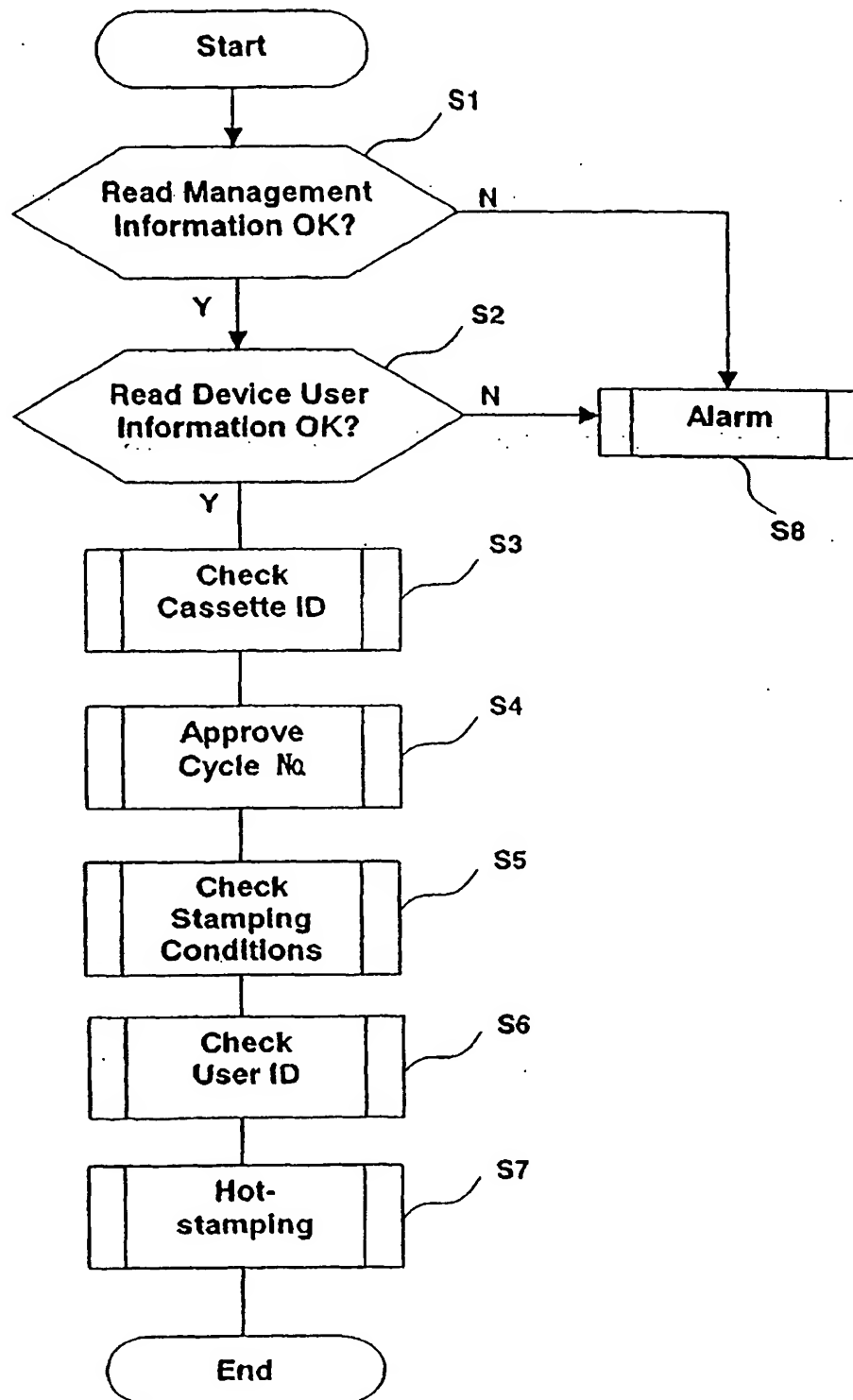


Fig.24

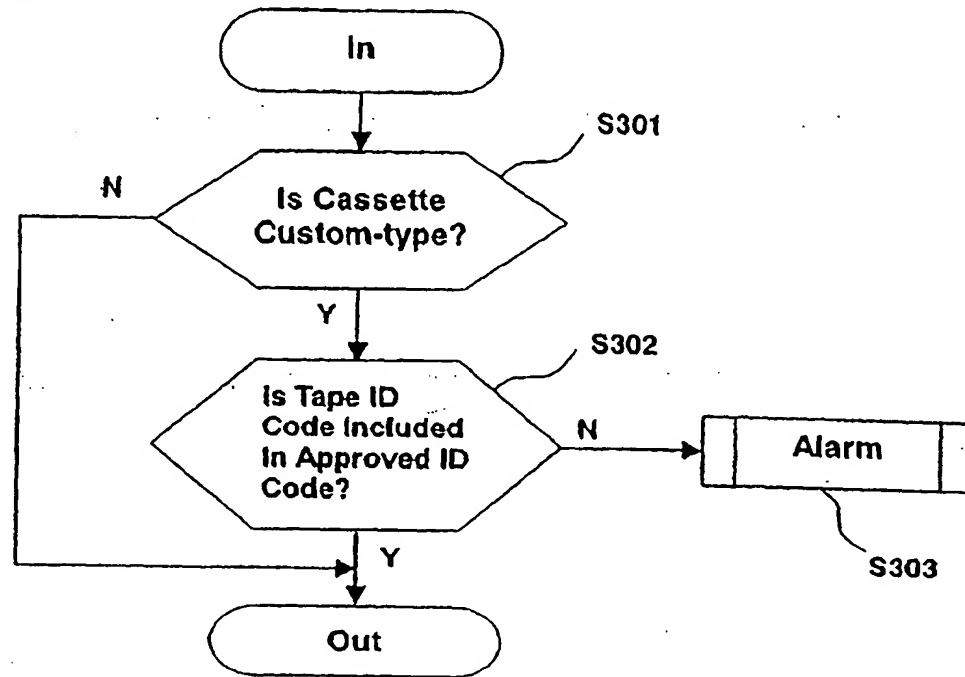


Fig.25

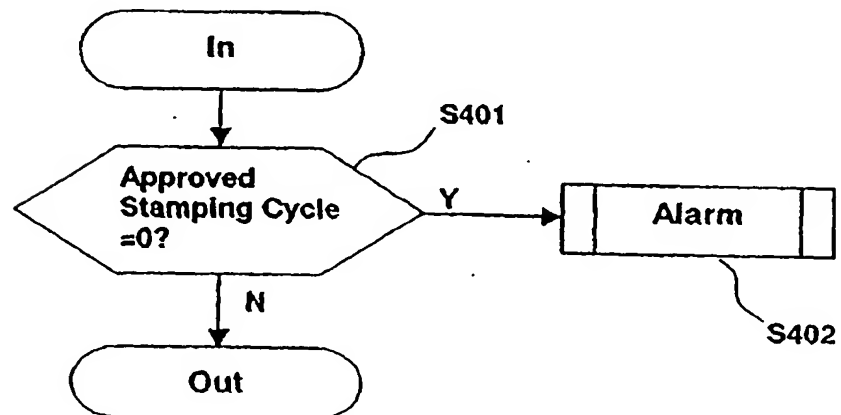


Fig.26

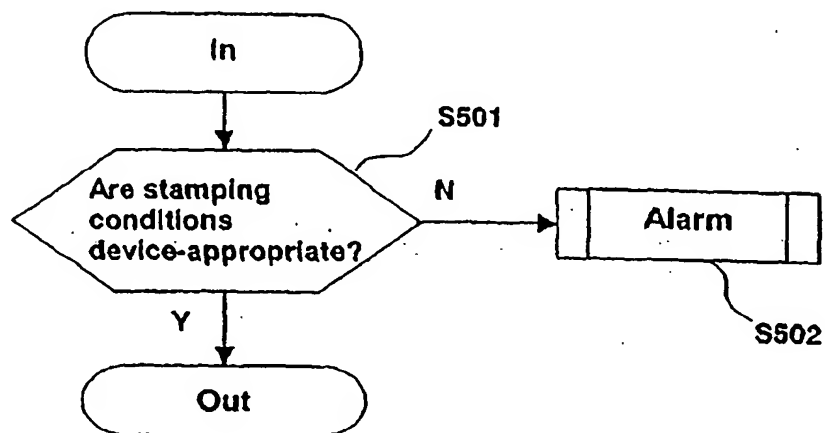


Fig.27

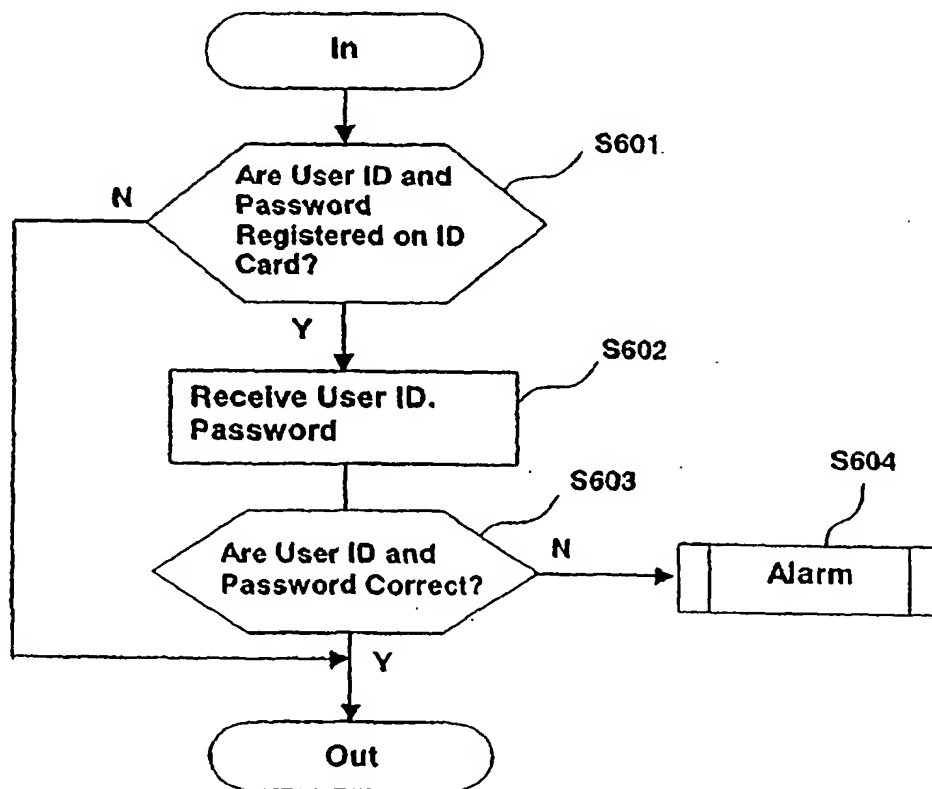


Fig.28

